

Josip Juraj Strossmayer University of Osijek  
FACULTY OF AGROBIOTECHNICAL SCIENCES OSIJEK

## **List of Elective Courses**

University Graduate Study Programmes

AGRICULTURAL ECONOMICS

PLANT PRODUCTION

MECHANIZATION

ZOO-TECHNIQUE

VEGETABLE AND FLOWER GROWING

ECOLOGICAL AGRICULTURE

FRUIT GROWING, VITICULTURE AND WINE PRODUCTION

Academic Year 2022-23

June, 2022

COORDINATOR	COURSE NAME	TEACHERS ON THE COURSE AND TYPE OF CLASSES						ECTS
		NAME AND SURNAME	LECTURES	SEMINARS	EXERCISES			
					FP	AP	LP	
Vlado Guberac	Agricultural Engineering in Arable Crops Seed Production	Vlado Guberac	35	40				6
Vlado Guberac	Gene banks	Vlado Guberac Vedran Orkić	35	40				6
Dinko Jelkić	Aquaculture	Dinko Jelkić Anđelko Opačak	20 20	7 8		10	10	6
Siniša Ozimec	Biocenoses of Terrestrial and Water Habitats	Siniša Ozimec Denis Deže Anđelko Opačak Dinko Jelkić	35 20		10 10			6
Miroslav Lisjak	Plants Analysis	Miroslav Lisjak	60				15	6
Tihana Teklić	Testing of seed quality	Vlado Guberac Tihana Teklić Miroslav Lisjak	35 20				20	6
Miroslav Lisjak	Mechanisms and phyto-regulation methods	Aleksandar Stanisavljević Miroslav Lisjak	20 30	5	10		10	6
Brigita Popović	Analysis of Soil and Fertilizers	Brigita Popović Vladimir Ivezic Vladimir Zebec	20 10	5 10			30	6
Brigita Popović	Composing of fertilization recommendations in horticulture	Ružica Lončarić Brigita Popović Vladimir Ivezic	10 15 15				5 5	6
Zdenko Lončarić	Computer systems of decision	Zdenko Lončarić Jasenska Ćosić Mirjana Brmež Ružica Lončarić	25 5 5 10	5 5 5 10			5	6
Alka Turalija	Harvest and Storage of Vegetables and Flowers	Vlatka Rozman Pavo Lucić Alka Turalija Boris Ravnjak	15 15	5 10		5 15 5	5	6

Dražen Horvat	Biometrics	Dražen Horvat Andrijana Rebekić	45			30		6
Dražen Horvat	Principles of Scientific Paper	Dražen Horvat	45	30				6
Zoran Škrtić	Biometrics in Zoo-technique	Zoran Škrtić	50	-		25		6
Jasenka Ćosić	Diseases of Vegetables and Flowers	Jasenka Ćosić Karolina Vrandečić	25 15	20			15	6
Miro Stošić	Ecological Agriculture	Miro Stošić Danijel Jug Danijela Samac	30 20 10			15		6
Marija Ravlić	Application of Pesticides in Agriculture	Renata Baličević Marija Ravlić	30 10	15	5		15	6
Marija Ravlić	Programs of Fruit trees and vine protection	Renata Baličević Marija Ravlić	30 10	20	5		10	6
Ranko Gantner	Ecological Forage crops	Ranko Gantner Gordana Bukvić Goran Herman	25 15	5		5	25	6
Ranko Gantner	Forage crops breeding	Ranko Gantner Gordana Bukvić Goran Herman	25 15	5		5	25	6
Zlatko Puškadija	Ecological Beekeeping	Zlatko Puškadija Marin Kovačić	30 30		8 -		7	6
Miro Stošić	Ecological Vegetable Growing	Miro Stošić Brigita Popović Boris Ravnjak	15 15	10 5	5		20	6
Tomislav Vinković	Medicinal and spice plants	Tomislav Vinković	35	10	5	20	5	6
Tomislav Vinković	Plant Growing in Greenhouses or Glasshouses	Tomislav Vinković Monika Tkalec Kojić Boris Ravnjak	35	10		10 10	5	6
Snježana Tolić	Economics of Processing	Snježana Tolić	45	30				6
Pero Mijić	Etology of Animals	Pero Mijić Boris Antunović Mirjana Baban Tina Bobić	15 10 5	20			10	6

		Maja Gregić				5		
Pero Mijić	Animal Husbandry in Tropic and Sub tropic Conditions	Pero Mijić Zvonko Antunović Zlatko Puškadija Tihomir Florijančić Mirjana Baban Josip Novoselec Tina Bobić Maja Gregić	10 5  5	15  5 5		5 15 5		6
Edita Štefanić	Phytoecology	Edita Štefanić Sanda Rašić	45		10	20		6
Edita Štefanić	Basics of Palynology	Edita Štefanić Sanda Rašić	45	10			20	6
Ivona Djurkin Kušec	Genomics in Zootechnique	Goran Kušec Vladimir Margeta Ivona Djurkin Kušec	20 20 25	10				6
Mladen Jurišić	Sustainable technologies of plant breeding	Mladen Jurišić Irena Rapčan	40 20			15		6
Mladen Jurišić	Geoinformation Systems and Analysis of Spatial Data	Mladen Jurišić Dorijan Radočaj	35	15	10	15		6
Ivan Plaščak	Basics of digital mapping	Ivan Plaščak Dorijan Radočaj	35	15	10	15		6
Mladen Jurišić	GIS Application in Horticulture	Mladen Jurišić Ivan Plaščak Dorijan Radočaj	35 15	5	10	10		6
Goran Heffer	Hydraulic Devices of Agricultural Machines	Goran Heffer Ivan Vidaković Goran Pačarek	45			20 10		6
Goran Heffer	Mechanisms of agricultural machines	Goran Heffer Ivan Vidaković Goran Pačarek	45			20 10		6
Dražen Horvat	IT in Agriculture	Dražen Horvat Andrijana Rebekić	35	5		35		6

Boris Đurđević	Composing of fertilization recommendations in crop production	Boris Đurđević	30				10	6
		Irena Jug	25				10	
Vesna Vukadinović	Mapping and soil distant researches	Vesna Vukadinović	50				25	6
Vesna Vukadinović	Assessment of Soil Suitability	Vesna Vukadinović Boris Đurđević	40 10				25	6
Ružica Lončarić	Channels of agricultural food products distribution	Ružica Lončarić	50	25				6
Igor Kralik	Products and Services Policy	Igor Kralik Sanja Jelić Milković	50	15 10				6
Ivica Bošković	Hunting and cynology	Ivica Bošković Tihomir Florijančić	20 20		15 5		15	6
Aleksandar Stanisavljević	Mediterranean fruit-growing and viticulture	Aleksandar Stanisavljević Vladimir Jukić Mato Drenjančević Toni Kujundžić Dejan Bošnjak	40 5 15 10			5		6
Aleksandar Stanisavljević	Indoor Plant Growing	Aleksandar Stanisavljević Dejan Bošnjak	65			10		6
Vladimir Jukić	Fruit Growing, Viticulture and Wine Production	Vladimir Jukić Aleksandar Stanisavljević Mato Drenjančević Dejan Bošnjak Toni Kujundžić	5 25 15 20			5 5		6
Aleksandar Stanisavljević	Traditional and Indigenous Perennial Crops	Aleksandar Stanisavljević Dejan Bošnjak	70			5		6
Mato Drenjančević	Management systems in Fruit growing and Viticulture	Mato Drenjančević Aleksandar Stanisavljević Vladimir Jukić	20 35 20					6
Boris Lukić	Methods and plans of animal selection	Boris Lukić Nikola Raguž	35 10			30		6

Nikola Raguž	Preservation of animal genetic resources	Nikola Raguž Vladimir Margeta Pero Mijić Zlata Kralik Mirjana Baban Zvonko Antunović Josip Novoselec Boris Lukić	25 8 8 8 8 4 4	10				6
Gabriella Kanižai Šarić	Soil microbiology	Gabriella Kanižai Šarić	40	15			20	6
Irena Jug	Monitoring and environment protection	Irena Jug Vesna Vukadinović Boris Đurđević	20 20 20				15	6
Domagoj Rastija	Applied pedology	Domagoj Rastija Vladimir Zebec	40 20				15	6
Vladimir Zebec	Field researches	Domagoj Rastija Vladimir Zebec	10 15				50	6
Davor Kralik	Mužnja i muzni uređaji	Davor Kralik Boris Antunović	60 5		10			6
Davor Kralik	Renewable energy resources in Agriculture	Davor Kralik Đurđica Kovačić	55 10		10			6
Mirjana Brmež	Nematology	Mirjana Brmež Josipa Puškarić	50		5		20	6
Davor Kralik	Facilities and ventilation systems in Animal production	Davor Kralik Boris Antunović	60 5		10			6
Manda Antunović	Breeding of industrial plants	Manda Antunović	50	5	20			6
Sunčica Kujundžić	Cereals breeding	Sonja Vila Sunčica Kujundžić	10 25	25		10		6
Jelena Ilić	Basics of bacteriology and virology	Jelena Ilić Tamara Siber	60	15				6
Marija Ravlić	Wild edible and poisonous plants	Renata Baličević Marija Ravlić	5 40				30	6
Edita Štefanić	Agricultural Phytocenology	Edita Štefanić	45					6

		Sanda Rašić			20		10	
Snježana Tolić	Business communications and Extension work	Snježana Tolić Olga Klepač	50	25				6
Tihomir Živić	Business foreign language - English	Tihomir Živić	30			45		6
Tihomir Živić	Business foreign language - German	Tihomir Živić	30			45		6
Suzana Kristek	Application of bio-preparations in vegetables and flowers production	Suzana Kristek Jurica Jović	55				20	6
Luka Šumanovac	Transport Systems in Fruit , Vine and Wine production	Luka Šmanovac Darko Kiš Domagoj Zimmer Vjekoslav Tadić	25 10 20	10		10		6
Domagoj Zimmer	Development of technical systems in vegetable and flower growing	Domagoj Zimmer	40			35		6
Tihana Sudarić	Rural Tourism	Tihana Sudarić Krunoslav Zmaić Lucija Bencarić.	50 10	15				6
Tihana Sudarić	Sustainable rural development	Tihana Sudarić Jadranka.Deže Krunoslav Zmaić Lucija Bencarić	25 20 15	5 10				6
Đuro Banaj	Machines and Devices in Ecological Protection and Plant Care	Đuro Banaj Vjekoslav Tadić	25 35		10 5			6
Đuro Banaj	Technical Exploitation Expertise of Devices in Permanent Plantations Protection	Đuro Banaj Vjekoslav Tadić	25 35		10 5			6
Lončarić Ružica	Decision Support Systems in Agriculture	Ružica Lončarić	50	25				6

Lončarić Ružica	Market and marketing in horticulture	Ružica Lončarić Sanja Jelić Milković	50	15 10				6
Ljubica Ranogajec	Modern Methods in Cost Accounts	Ljubica Ranogajec Ana Crnčan	60	15				6
Ankica Sarajlić	Pests in Vegetables and Flowers	Ankica Sarajlić	45	30				6
Ivana Majić	Pests in Arable Crops	Ivana Majić	30	35			10	6
Ankica Sarajlić	Pests in Orchards and Vineyards	Ankica Sarajlić	20	5				6
		Jelena Ilić	10	5				
		Brankica Svitlica	10					
		Renata Baličević	20	5				
Monika Marković	Technical Systems in Irrigation	Monika Marković	30					6
		Alka Turalija	15					
		Antonija Kojić				30		
Irena Rapčan	The technique of storing a voluminous stern	Irena Rapčan	40					6
		Vjekoslav Tadić	20		15			
Goran Heffer	Friction and wear of agricultural machinery	Goran Heffer Ivan Vidaković Goran Pačarek	50				20 5	6
Bojan Stipešević	Tropical Crops	Bojan Stipešević	30					6
		Danijel Jug	25					
		Bojana Brozović	10	5		5		
Željko Barač	Usage and Maintenance of Technical Systems	Željko Barač	15	20	15		15	6
		Tomislav Jurić	10					
Ivana Majić	Plant protection II	Ivana Majić	25					6
		Jelena Ilić	20	5				
		Ankica Sarajlić		25				
Monika Marković	Soil and water protection	Monika Marković	45			30		
Boris Antunović	Animal Health protection	Boris Antunović	55					6
		Mislav Đidara	20					
Vladimir Ivezić	Agroforestry	Vladimir Ivezić	60	10		5		6
Zdenko Lončarić	Heavy metals in the antroposphere	Zdenko Lončarić	30					6
		Vladimir Ivezić	10	5				



		Marcela Šperanda	15	5				
		Zvonko Antunovićš	5					
		Tihomir Florijančić	5					
Irena Jug	Sustainable soil management	Irena Jug	30					6
		Danijel Jug	15					
		Boris Đurđević	15					
		Vesna Vukadinović	15					
Boris Đurđević	Integrated fertilization	Irena Jug	20					6
		Boris Đurđević	35					
		Vesna Vukadinović	20					
Ivica Bošković	Game Breeding and Protection	Tihomir Florijančić	10					6

<b>AGROFORESTRY</b>		
<b>Coordinator</b>	Vladimir Ivezić	
<b>Collaborators</b>	Vladimir Margeta	
<b>Study year and semester</b>	2 <sup>nd</sup> year, III semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	L+E+S	75 (60L + E5 + 10S)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	To describe agroforestry systems and their significance for the diversification of agricultural production and environmental protection. To provide examples of the functions of woody species in agricultural land (windbreaks, soil purification, nutrient input, carbon sequestration, biodiversity, and bioenergy production). To analyze the socio-economic potential of agroforestry for rural development.	
<b>Course enrolment requirements</b>	None	
<b>Intended course learning outcomes</b>		
<ol style="list-style-type: none"> <li>1. Classify agroforestry systems, provide examples of different systems, and explain their significance for the diversification of agricultural production and environmental protection.</li> <li>2. Describe forest management practices and select the most suitable woody species for agroforestry systems.</li> <li>3. Connect knowledge from agriculture with newly acquired knowledge from forestry.</li> <li>4. Describe the role of agroforestry systems in mitigating greenhouse gas effects (carbon sequestration).</li> <li>5. Recognize the importance of agroforestry systems on degraded soils.</li> <li>6. Analyze the socio-economic potential of agroforestry for rural development.</li> <li>7. Identify obstacles to the establishment of agroforestry systems.</li> <li>8. Prepare a seminar on agroforestry practices</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
The final grade for students takes into account continuous monitoring of attendance (activity in class, preparation for lessons, reflective examination of teaching content), seminar paper, and final written exam. The grading of the seminar paper includes clarity, accuracy, and relevance of the information presented, as well as the overall (technical and visual) quality of the presentation. Attendance is obligatory according to the Regulations on Studies at J.J. Strossmayer University in Osijek. The final exam is obligatory.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Rigueiro-Rodríguez, J. McAdam, and M.R. Mosquera-Losada (Eds.) (2009): Agroforestry in Europe. Springer Science + Business Media B.V. (pp. 3-89; pp. 321-349)</li> <li>2. Quinkenstein, J. Wöllecke, C. Böhm, H. Grünwald, D. Freese, B. U. Schneider, R. F. Hüttl (2009): Ecological benefits of the alley cropping agroforestry system in sensitive regions of Europe. <i>Env. Sci. &amp; Policy</i>, 12; 1112-11214. New direction for agriculture, forestry and fisheries, SARD-Sustainable agriculture and rural development, FAO, p. 65, Rome, 1995 (web address)</li> <li>3. Tomašević, A. (1996): Vjetrozaštita Sinjskog polja. <i>Šumarski list</i> br. 1—2, CXX (1996), 19—34</li> <li>4. Dimitriou, I, Rutz, D. (2015): Short Rotation Cultures – A Manual on Sustainable Cultivation. WIP Renewable Energies, Munich, Germany (HRV edition, Energy Institute Hrvoje Požar)</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. P.K. Ramachandran Nair. (1993): An Introduction to Agroforestry. Kluwer Academic Publishers (in cooperation with ICRAF). 496 p.</li> <li>2. H. E. Garrett, W. J. Rietveld, and R.F. Fisher (2000): North American Agroforestry: An Integrated Science and Practice. American Society of Agronomy Inc.</li> <li>3. M.R. Mosquera-Losada, D. Freese, and A. Rigueiro-Rodríguez (2011): Carbon Sequestration in European Agroforestry Systems. In: B. Mohan Kumar and P.K. Ramachandran Nair (eds): Carbon Sequestration Potential of Agroforestry Systems. Springer Science + Business Media B.V.</li> <li>4. L.E. Buck, J.P. Lassoie and E.C.M. Fernandes (1999): Agroforestry in Sustainable Agricultural Systems. CRC Press LLC (chapters: 1, 3, 5, 9, 13, 17)</li> </ol>		

5. S. Jose and A. M. Gordon (2008): *Toward Agroforestry Design – An Ecological Approach*. Springer Science + Business Media B.V. (chapters: 10, 16, 18)
6. Čavlović, J. (2013): *Osnove uređivanja šuma*. Izdavač: Šumarski fakultet Sveučilišta u Zagrebu, 2013, ISBN 978-953-292-028-4
7. H. Grünewald, C. Böhm, A. Quinkenstein, P. Grundmann, J. Eberts and G. von Wühlisch (2009): *Robinia pseudoacacia L.: A Lesser Known Tree Species for Biomass Production*. *Bioenerg. Res.* 2:123–133
8. H. Grünewald, B. K.V. Brandt, B. U. Schneider, O. Bensa, G. Kendzia and R. F. Hüttl (2007): *Agroforestry systems for the production of woody biomass for energy transformation purposes*. *Ecological Engineering* 29: 319–328

<b>AGRICULTURAL ENGINEERING IN ARABLE CROPS SEED PRODUCTION</b>		
<b>Coordinator</b>	Vlado Guberac	
<b>Collaborators</b>	none	
<b>Study year and semester</b>	2 <sup>nd</sup> year, III semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	Number of hours (L+E+S)	75 (35L + 40S)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	To familiarize students with the basics of seed production and the application of agrotechnical measures in the production of seeds for important field crops.	
<b>Course enrolment requirements</b>	none	
<b>Intended course learning outcomes</b>		
<ol style="list-style-type: none"> <li>1. Differentiate between seed categories and methods of their production.</li> <li>2. Implement the process of seed crop certification.</li> <li>3. Distinguish the specific characteristics of seed production depending on the plant species.</li> <li>4. Apply appropriate agrotechnical measures in the seed production of field crops.</li> <li>5. Analyze problems in seed production related to the implementation of agrotechnical measures.</li> <li>6. Discuss and critically comment on a given topic in seed production.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
The final grade includes, continuous monitoring of attendance (class participation, preparation for lessons, reflective assessment of teaching content), seminar paper, and oral exam. The evaluation of the seminar includes clarity, accuracy, and relevance of the information presented, as well as the overall (technical and visual) quality of the presentation. Attendance is obligatory according to the Regulations on Studies at J.J. Strossmayer University in Osijek. The final exam is obligatory.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Guberac, V. (2000): Sjemenarstvo ratarskih kultura. Skripta. Poljoprivredni fakultet u Osijeku</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Guberac, V. (2000): Sjemenarstvo ratarskih kultura. Skripta. Poljoprivredni fakultet u Osijeku, 83 pages</li> <li>2. Milošević, M., Kobiljski, B. (2011): Semearstvo I-III. Monografija. Institut za ratarstvo i povrtarstvo. Novi Sad</li> <li>3. Black, M., Bewley, D.J., Halmer, P. (2008): The Encyclopedia of Seeds. CABI International.</li> <li>4. Babasaheb B. Desai (2004): Seeds Handbook. Marcel Dekker, Inc.</li> </ol>		

<b>AQUACULTURE</b>		
<b>Coordinator</b>	Dinko Jelkić	
<b>Collaborators</b>	Anđelko Opačak	
<b>Study year and semester</b>	2 <sup>nd</sup> year, III semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	(L+E+S)	75 (40L + 20E + 15S)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	To familiarize master's students with modern achievements in fish and other aquatic organism cultivation technology in various farming systems.	
<b>Course enrolment requirements</b>	None	
<b>Intended course learning outcomes</b>		
<ol style="list-style-type: none"> <li>1. Recognize the significance and role of aquaculture in the production of human food worldwide.</li> <li>2. Describe and correlate processes in aquaculture technology of aquatic organisms in mariculture.</li> <li>3. Describe and correlate processes in fish cultivation technology in freshwater aquaculture.</li> <li>4. Present the process of cultivating live food for aquatic organisms.</li> <li>5. Analyze and predict the impact of aquaculture on the environment and explain methods for mitigating harmful effects.</li> <li>6. Consider and classify combined cultivation of fish, plants, and animals, explaining the advantages and disadvantages of this method of cultivation.</li> <li>7. Define the equipment of a recirculating system and recognize the function of each device.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
Students must collect a minimum number of assessment points to qualify for the final exam. Assessment points are awarded based on class attendance (minimum 70%), participation, and scores from partial exams. During the semester, students take two partial exams (in the 7th and 15th weeks of classes). The final exam is obligatory, and a positive grade from 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. Adamek, Z. (2005): Uzgoj salmonidnih riba. U: Bogut, I., Horvath, L., Zdenek, A., katavić, I. (2005): Ribogojstvo. Poljoprivredni fakultet u Osijeku, Osijek, 223-305.</li> <li>2. Katavić, I. (2005): Marikultura. U: Bogut, I., Horvath, L., Zdenek, A., katavić, I. (2005): Ribogojstvo. Poljoprivredni fakultet u Osijeku, Osijek,</li> <li>3. Opačak, A. (2015): Hranidba riba. U: Domačinović, M., Antunović, Z., Džomba, E., Opačak, A., Baban, M, Mužić S. (2015): Specijalna hranidba domaćih životinja. Poljoprivredni fakultet u Osijeku, Osijek</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Stickney, R. R. (2016). Aquaculture: An introductory text. Cabi.</li> <li>2. Beveridge, M. C. (2008). Cage aquaculture. John Wiley &amp; Sons.</li> <li>3. Timmons, M. B., Ebeling, J. M. (2007): Recirculating Aquaculture. Cayuga Aqua Ventures, Ithaca.</li> </ol>		

<b>ANALYSIS OF SOIL AND FERTILIZERS</b>		
<b>Coordinator</b>	Brigita Popović	
<b>Collaborators</b>	Vladimir Ivezić, Vladimir Zebec	
<b>Study year and semester</b>	2 <sup>nd</sup> year, III semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	(L+E+S)	75 (30L + 30E + 15 S)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	To familiarize students with soil and fertilizer analyses that allow comparison of results from various analyses on the same and different samples. To build upon knowledge of the accepted methodology for soil and fertilizer analysis and the interpretation of the resulting data.	
<b>Course enrolment requirements</b>	none	
<b>Intended course learning outcomes</b>		
<ol style="list-style-type: none"> <li>1. Identify the soil analyses used in Croatia.</li> <li>2. Identify the methods of soil analysis used worldwide.</li> <li>3. Identify existing analyses of organic and mineral fertilizers.</li> <li>4. Identify the resulting data obtained from analyses.</li> <li>5. Prepare a seminar with a detailed interpretation of the results of a specific group of analyses</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
Students qualify to take the final exam by accumulating a minimum number of assessment points. Points are accrued through class attendance and exercises (minimum 70%) with a particular emphasis on laboratory work (activity in tasks) and results from partial exams. During the semester, students take three partial exams and are required to prepare a seminar paper. The final exam is obligatory and oral.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Lončarić Z. (2009) Analiza tla i gnojiva. Program vježbi iz kolegija (interna skripta)</li> <li>2. Pravilnik o metodologiji za praćenje stanja poljoprivrednog zemljišta, NN 47/2019.</li> <li>3. Tehnološke upute za tumačenje rezultata analiza tla za praćenje stanja poljoprivrednog zemljišta, HAPIH, 2020.</li> <li>4. Pravilnik o dobroj poljoprivrednoj praksi u korištenju gnojiva, NN 56/2008</li> <li>5. Jones, J.B. Jr. (2001): Laboratory Guide for Conducting Soil Tests and Plant Analysis. CRC Press. Boca Raton, London, New York, Washington, D.C. (book)</li> <li>6. ISO standardi u području analize tla i gnojiva</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Westerman, R.L. (1990): Soil Testing and Plant Analysis. Third Edition. Number 3 in the Soil Science of America Book Series. SSSA, Madison, Wisconsin, USA.</li> <li>2. Havlin, J.L., Jacobsen, J.S. (1994): Soil Testing: Prospects for Improving Nutrient Recommendations. SSSA Special Publication Number 40. SSSA, ASA, Madison, Wisconsin, USA. (book)</li> <li>3. Allen, S.E. (1989): Chemical Analysis of Ecological Materials, 2nd ed. Blackwell Scientific Publications, Oxford. (book)</li> </ol>		

<b>PLANTS ANALYSIS</b>		
<b>Coordinator</b>	Miroslav Lisjak	
<b>Collaborators</b>	None	
<b>Study year and semester</b>	2 <sup>nd</sup> year, III semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	(L+E+S)	75 (60L + 15E)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	To familiarize students with the methodology for determining the chemical, morphological, and physiological properties of plants relevant to mineral nutrition and yield formation.	
<b>Course enrolment requirements</b>	Physiology of Mineral Nutrition	
<b>Intended course learning outcomes</b>		
<ol style="list-style-type: none"> <li>1. List the most commonly used methods for analyzing plant material for agricultural purposes.</li> <li>2. Differentiate and identify specific chemical, morphological, and physiological properties of plants regarding productivity and quality assessment.</li> <li>3. Plan the scope of necessary samples, analytical instruments, and chemicals for analyzing the chemical composition and quality of plant material.</li> <li>4. Integrate theoretical knowledge with plant analysis methodology.</li> <li>5. Interpret the results of conducted analyses of plant samples</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
Student performance is regularly evaluated during teaching activities: attendance and participation in lectures and exercises are monitored, and knowledge is assessed through partial evaluations and final exam. The final grade is determined based on continuous monitoring of class activities (participation in class, preparation for lectures, reflective reviews of course content), exercises (class participation, preparation for sessions, and effectiveness in completing exercises), and the final exam. The final exam is obligatory.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Teklić, T. (2012): Fiziologija bilja (skripta s predavanjima)</li> <li>2. Lisjak, M., Špoljarević, M., Agić, D., Andrić, L. (2009): Praktikum iz fiziologije bilja. Poljoprivredni fakultet Osijek.</li> <li>3. Arsenijević-Maksimović, I., Pajević, S. (2002): Praktikum iz fiziologije biljaka. Poljoprivredni fakultet u Novom Sadu.</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Roger, M.J.R.(ed.) (2001): Handbook of plant ecophysiology techniques. Kluwer Academic Publishers.</li> <li>2. Reiss, C. (1994): Experiments in plant physiology. Prentice Hall</li> <li>3. Lončarić, Z., Rastija, D., Popović, B., Karalić, K., Ivezić, V., Zebec, V. (2014): Uzorkovanje tla i biljke za agrokemijske i pedološke analize. Lončarić, Z. (ur.). Poljoprivredni fakultet Osijek (priručnik)</li> </ol>		

<b>HARVEST AND STORAGE OF VEGETABLES AND FLOWERS</b>		
<b>Coordinator</b>	Alka Turalija	
<b>Collaborators</b>	Vlatka Rozman Pavo Lucić Boris Ravnjak	
<b>Study year and semester</b>	2 <sup>nd</sup> year, III semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	(L+E+S)	75 (30L + 30E + 15S)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	To familiarize students with methods of harvesting and storing vegetable, ornamental, and medicinal crops	
<b>Course enrolment requirements</b>	none	
<b>Intended course learning outcomes</b>		
<ol style="list-style-type: none"> <li>1. Determine the harvesting date for vegetables and flowers.</li> <li>2. Define the properties of water, air, and products required for processing and storage.</li> <li>3. Define the physical and chemical properties of vegetables, flowers, and medicinal crops during processing and storage.</li> <li>4. Identify equipment, processes, and facilities for processing, drying, and storage.</li> <li>5. Select and apply appropriate technologies for preserving and processing vegetables and flowers.</li> <li>6. Sort vegetables and flowers according to market demands and storage and processing requirements.</li> <li>7. Solve problems during storage and choose optimal technologies to prevent them.</li> <li>8. Manage harvesting, storage, and processing operations.</li> <li>9. Explain factors that influence the viability of stored vegetables and flowers.</li> <li>10. Identify physiological processes during the storage of vegetables and flowers.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
<p>Attendance at lectures: 2 ECTS credits, continuous monitoring of teaching (activity during classes, preparation for lectures, reflective review of teaching content): 0.4 ECTS credits, continuous monitoring and knowledge assessment (partial exam): 1 ECTS credit, seminar paper: 0.2 ECTS credits, oral exam: 1.4 ECTS credits. Total: 6 ECTS credits. In determining the final grade for students, continuous monitoring of teaching (activity during classes, preparation for lectures, reflective review of teaching content), continuous monitoring and assessment of knowledge (partial exams), and the final oral exam are taken into account. Attendance at classes is obligatory according to the Regulations on Studies and Studying at J.J. Strossmayer University of Osijek. The final exam is obligatory.</p>		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Lešić, R., Borošić, J., Buturac, M., Ćustić, M., Poljak, ., Romić, D. (2002): Povrčarstvo. Zrinski d.d., Čakovec:1-627.</li> <li>2. Kalinović, I.(1997): Skladištenje i tehnologija ratarskih proizvoda. Interna skripta. Poljoprivredni fakultet u Osijeku:1-129.</li> <li>3. Doijode, S.D.(2001): Seed Storage of Horticultural Crops,Seed Science,Hort Science,USA</li> <li>4. Hodges, M.(2003): Postharvest Oxidative Stress in Horticultural Crops,Nova Scotia, Canada</li> <li>5. Parađiković, N. (2009.): Zaštićeni prostori plastenici – staklenici, Poljoprivredni fakultet Osijek.</li> <li>6. Parađiković, N. (2009.): Opće i specijalno povrčarstvo, sveučilišni udžbenik, Poljoprivredni fakultet Osijek.</li> <li>7. Parađiković, N. (2014): Osnove florikulture – interna skripta, Poljoprivredni fakultet Osijek</li> <li>8. Katić, Z, (1997.): Sušenje i sušare u poljoprivredi, knjiga, Multi graf d.o.o, Zagreb</li> <li>9. Ritz, J. (1997.): Uskladištavanje ratarskih proizvoda, knjiga, PBI d.o.o., Zagreb</li> <li>10. Ujević, A. (1988.): Tehnologija dorade i čuvanje sjemena, Fakultet poljoprivrednih znanosti i Bc institut, Zagreb</li> <li>11. Rozman, V., Liška, A. (2007): Skladištenje ratarskih proizvoda – interna skripta, Poljoprivredni fakultet u Osijeku</li> </ol>		



12. Voća, S., Dobričević, N., Šic Žlabur, J. (2011.): Priručnik za vježbe iz modula Prerada voća i povrća Zagreb. Web stranica Agronomskog fakulteta Sveučilišta u Zagrebu

**Additional literature**

1. Matotan,Z.(2004): Suvremeno povrćarstvo, Nakladni zavod, Globus,Zagreb
2. Znanstveni i stručni radovi iz relevantnih časopisa i baza vezani za proizvodnju cvjećarskih kultura

<b>BIOCENOSES OF TERRESTRIAL AND WATER HABITATS</b>		
<b>Coordinator</b>	Siniša Ozimec	
<b>Collaborators</b>	Anđelko Opačak Dinko Jelkić Denis Deže	
<b>Study year and semester</b>	2 <sup>nd</sup> year, III semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	(L+E+S)	75 (55L + 20 E)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	To familiarize students with biocenoses as communities of plant and animal population taxa that inhabit terrestrial and aquatic habitat types. To acquaint them with the characteristics of populations, the development and dynamics of biocenoses, and methods for monitoring conservation status.	
<b>Course enrolment requirements</b>	none	
<b>Intended course learning outcomes</b>		
<ol style="list-style-type: none"> <li>1. List the components of a biocenosis.</li> <li>2. Connect trophic, interspecies, and intraspecies relationships at the population level.</li> <li>3. Differentiate ecological factors that influence the characteristics and spatial distribution of populations.</li> <li>4. Identify the habitat type at the sampling site.</li> <li>5. Collect data on the presence, abundance, and condition of populations of various groups of living organisms.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
In determining the final grade, regular attendance (at least 70% of teaching hours), activities during classes and field exercises, and the final oral exam are taken into account. The right to take the final exam is earned by accumulating the minimum number of grade points. The final exam is obligatory.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Topić, J., Vukelić, J. (2009.): Priručnik za određivanje kopnenih staništa u Hrvatskoj prema Direktivi o staništima EU. Državni zavod za zaštitu prirode, Zagreb.</li> <li>2. Opačak, A., Jelkić, D. (2020.): Štetnici i neprijatelji riba na šaranskim ribnjacima. Sveučilište Josipa Jurja Strossmayera u Osijeku, Fakultet agrobiotehničkih znanosti Osijek.</li> <li>3. Ternjej, I., Brigić, A., Gottstein, S., Ivković, M., Kerovec, M., Mihaljević, Z., Previšić, A. (2019.): Terenske i laboratorijske vježbe i statističke metode u ekologiji. Školska knjiga, Zagreb.</li> <li>4. Šolić, M. (2018.): Ekologija zajednica i ekosustava. Golden marketing-Tehnička knjiga, Zagreb, Institut za oceanografiju i ribarstvo, Split</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Topić, J., Ilijanić, Lj., Tvrtković, N., Nikolić, T. (2006.): Staništa: priručnik za inventarizaciju, kartiranje i praćenje stanja. Državni zavod za zaštitu prirode.</li> <li>2. Nikolić, T. (2006): Flora: priručnik za inventarizaciju i praćenje stanja. Državni zavod za zaštitu prirode, Zagreb.</li> <li>3. Holcer, D., Pavlinić, I. (2008.): Fauna: priručnik za inventarizaciju i praćenje stanja. Državni zavod za zaštitu prirode, Zagreb.</li> </ol>		

<b>BIOMETRICS</b>		
<b>Coordinator</b>	Dražen Horvat	
<b>Collaborators</b>	Andrijana Rebekić	
<b>Study year and semester</b>	2 <sup>nd</sup> year, III semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	(L+E+S)	75 (45L + 30E)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	For students for whom this module was not mandatory in the first year of graduate studies, to present and explain the basics of scientific theory and scientific conclusions through the application of statistical methods and tests.	
<b>Course enrolment requirements</b>		
<b>Intended course learning outcomes</b>		
<ol style="list-style-type: none"> <li>1. Familiarize themselves with basic statistical terminology.</li> <li>2. Recognize appropriate experimental methods and techniques.</li> <li>3. Set research goals and scientific hypotheses. Organize and monitor experiments, collect experimental data, determine sample size, arrange statistical series, and group data.</li> <li>4. Calculate basic statistical parameters using descriptive statistics methods: measures of central tendency, measures of variation.</li> <li>5. Correctly apply parametric tests, analysis of variance, correlation-regression methods, and examine time series.</li> <li>6. Recognize and apply various diagrams as visual representations of the nature and distribution of experimental data.</li> <li>7. Properly select and apply non-parametric statistical methods and tests.</li> <li>8. Become acquainted with the basics of computer techniques in statistical data processing (Statistica, SAS).</li> <li>9. Think statistically (scientifically) by "reading" the results of statistical analyses.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
The right to take the final exam is earned by accumulating the minimum number of assessments points. Assessments points are achieved through class attendance (at least 70%), participation in class activities, and assessments from partial exams. During the semester, students take two partial exams (in the 7th and 15th week of classes). The final exam is obligatory, and a passing assessments 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. Horvat, D., Ivezić, M. (2005.): Biometrika u poljoprivredi. Poljoprivredni fakultet u Osijeku.</li> <li>2. Vasilj, Đ. (2000.): Biometrika i eksperimentiranje u bilinogojstvu. Hrvatsko agronomsko društvo. Zagreb</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Petz, B. (1985.): Osnovne statističke metode za nematematičare. SNL, Zagreb. Hadživuković, S. (1991.): Statistički metodi s primenom u poljoprivrednim i biološkim istraživanjima. Poljoprivredni fakultet, Novi Sad</li> <li>2. Mead, R., Curnow, R. N. and Hasted, A. M. (1993.): Statistical Methods in Agriculture and Experimental Biology. Chapman &amp; Hall.</li> </ol>		

<b>BIOMETRICS IN ZOO-TECHNIQUE</b>		
<b>Coordinator</b>	Zoran Škrtić	
<b>Collaborators</b>	Zlata Kralik	
<b>Study year and semester</b>	2 <sup>nd</sup> year, III semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	(L+E+S)	75 (50L + 25E)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	To familiarize and train module participants with basic statistical methods, designing, and conducting experiments. Analysis and interpretation of research results.	
<b>Course enrolment requirements</b>	none	
<b>Intended course learning outcomes</b>		
<ol style="list-style-type: none"> <li>1. Describe statistical methods used in animal science.</li> <li>2. Select a statistical method depending on the given written task.</li> <li>3. Use statistical software packages when working on a computer.</li> <li>4. Comment on the obtained results of statistical calculations.</li> <li>5. Compare different types of applied statistical methods.</li> <li>6. Interpret the obtained results of statistical hypothesis testing.</li> <li>7. Justify why a particular statistical method was applied in specific calculations.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
The right to take the final exam is earned by accumulating the minimum number of assessments points. Assessments points are achieved through class attendance (at least 70%), participation in class activities, and assessments from partial exams. During the semester, students take two partial exams (in the 7th and 15th week of classes). The final exam is obligatory, and a passing assessments 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. Barić Stana, Car, M. (1972): Metodika znanstvenih istraživanja u stočarstvu</li> <li>2. Kralik, Gordana, Škrtić, Z., Kralik, Zlata (2012): Biometrika u zootehnici. Sveučilište J.J.Strossmayera u Osijeku</li> <li>3. Snedecor, Cochrain (1988): Statistical method. Ames, Iowa, USA</li> <li>4. Šošić, J., Serdar, V. (2000): Uvod u statistiku. Školska knjiga, Zagreb</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Priručnici za korištenje statističkih programa</li> </ol>		

<b>DISEASES OF VEGETABLES AND FLOWERS</b>		
<b>Coordinator</b>	Jasenka Ćosić	
<b>Collaborators</b>	Karolina Vrandečić	
<b>Study year and semester</b>	2 <sup>nd</sup> year, III semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	(L+E+S)	75 (40L + 15E + 20S)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	To familiarize participants with the most significant diseases of potatoes, tomatoes, peppers, cucumbers, onions, lettuce, and flower diseases.	
<b>Course enrolment requirements</b>	None	
<b>Intended course learning outcomes</b>		
<ol style="list-style-type: none"> <li>1. Explain the impact of diseases on cultivation, yield, and yield quality.</li> <li>2. Identify the most significant disease-causing agents of the mentioned vegetables and flowers.</li> <li>3. Describe the symptoms, biology, and ecology of the 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 protection measures for the same crop when grown outdoors and in protected spaces.</li> <li>6. Describe protection measures.</li> <li>7. Discuss, argue, and critically comment on the assigned seminar topic.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
The right to take the final exam is earned by accumulating the minimum number of assessment points. Assessment points are achieved based on class attendance (at least 70%), participation in class activities, and grades from seminars and partial exams. During the semester, students take two partial exams (in the 7th and 15th 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 oral.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Kišpatić, J. (1988.): Bolesti šećerne repe i krumpira. Zagreb.</li> <li>2. Maceljki, M. i sur. (2004): Štetočinje povrća. Zrinski Čakovec.</li> <li>3. Horst, R.K. (1983.): Compendium of Rose Diseases. APS Press.</li> <li>4. Jurković, D., Ćosić, J., Vrandečić, K. (2010.): Bolesti cvijeća i ukrasnog bilja. Poljoprivredni fakultet u Osijeku.</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Kišpatić, J. (1992.): Opća fitopatologija. Agronomski fakultet Zagreb.</li> <li>2. Brmež, M., Ćosić, J., Raspudić, E., Baličević, R., Liška, A., Majić, I., Ilić, J., Sarajlić, A., Lucić, P., Ravlić, M., Puškarić, J. (2019.): Okolišno prihvatljiva zaštita bilja. Fakultet agrobiotehničkih znanosti Osijek</li> </ol>		

<b>ECOLOGICAL AGRICULTURE</b>		
<b>Coordinator</b>	Bojan Stipešević	
<b>Collaborators</b>	Danijel Jug Danijela Samac	
<b>Study year and semester</b>	2 <sup>nd</sup> year, III semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	(L+E+S)	75 (60L + 10E + 5S)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	To describe and familiarize the participant with the specifics of plant and livestock production based on ecological principles, consider the directions of eco-production worldwide and locally, and describe and explain the basic technological processes of eco-plant and eco-livestock production.	
<b>Course enrolment requirements</b>	none	
<b>Intended course learning outcomes</b>		
	<ol style="list-style-type: none"> <li>1. Apply crop production according to ecological principles and recognize the specifics of eco-production.</li> <li>2. Describe the technology of production and agronomy in organic farming.</li> <li>3. Organize livestock production based on ecological principles and assess specific aspects of eco-livestock production.</li> <li>4. Manage livestock production according to eco-principles in terms of breeding, feeding, treatment, transport, slaughter, and processing.</li> <li>5. Identify and plan eco-production in fruit growing, viticulture, and the production of medicinal and aromatic herbs.</li> <li>6. Understand the agro-ecological, organizational, and socio-economic aspects of transitioning to eco-production and state the legal regulations on ecological production in the Republic of Croatia.</li> <li>7. Critically and analytically define organic agricultural production.</li> </ol>	
<b>Assessment and evaluation of student work during classes</b>		
	Students are expected to attend classes continuously and actively participate in tasks during lectures. In the second part of the semester, fieldwork will be organized. Participation in fieldwork is obligatory. During the semester, three partial written exams will be held, and students will be informed about them. The final exam is obligatory, 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. Znaor, D., (1996.): Ekološka poljoprivreda, udžbenik, Globus, Zagreb</li> <li>2. Senčić, Đ., Antunović, Z. (2003.): Ekološko stočarstvo. Katava, Osijek</li> <li>3. Kisić, I., (2014.): Uvod u ekološku poljoprivredu, Zagreb</li> </ol>	
<b>Additional literature</b>		
	<ol style="list-style-type: none"> <li>1. Sattler, F., Wistinghausen, E., (1985): Der Landwirtschaftliche Betrieb, Biologisch-Dynamisch, Ulmer, Germany</li> <li>2. Hermann, G., Plakolm, G., (1993): Oekologischer Landbau (Grundwissen fuer die praxis); Verlagsunion Agrar, Austria</li> <li>3. Zakonska regulativa u ekološkoj poljoprivredi</li> </ol>	

<b>ECOLOGICAL FORAGE CROPS</b>		
<b>Coordinator</b>	Ranko Gantner	
<b>Collaborators</b>	Gordana Bukvić Goran Herman	
<b>Study year and semester</b>	2 <sup>nd</sup> year, III semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	(L+E+S)	75 (40L + 30E + 5S)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	To familiarize students with ecological production, storage, and use of voluminous forage on fields and meadows. To value the importance of ecological forage production for ecological livestock farming, the production of healthy food, environmental conservation, natural resource preservation, and the sustainable development of society and the economy.	
<b>Course enrolment requirements</b>	none	
<b>Intended course learning outcomes</b>		
<ol style="list-style-type: none"> <li>1. Find and apply relevant legislation for the production of organic forage crops.</li> <li>2. Determine the suitability of individual forage crops for various soil and climate conditions.</li> <li>3. Select agrotechnical measures in accordance with the principles of ecological production.</li> <li>4. Plan the sequence of agrotechnical measures for field forage crops and meadows, according to production needs and available resources.</li> <li>5. Plan the conservation of voluminous forages.</li> <li>6. Design an optimal feeding system as a link between available natural and technological resources on one side and livestock and environmental needs on the other side.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
The final grade includes: class activity (preparation for classes and reflective repetition of course content), seminar work, two partial exams and a final exam. The evaluation of the seminar paper will consider the clarity, accuracy and relevance of the information in the written seminar, as well as the overall (technical and visual) quality of the presentation. If a student misses more than 30% of classes, he loses the right to take the exam. The final exam is obligatory.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Gantner, R., Bukvić, G., Steiner, Z. (2021.): Proizvodnja krmnoga bilja. Sveučilišni udžbenik. Sveučilište J. J. Strossmayera u Osijeku, Fakultet agrobiotehničkih znanosti Osijek.</li> <li>2. Barker, A. V. (2010.): Science and Technology of Organic Farming. CRC Press Taylor &amp; Francis Group, Boca Raton.</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Barnes, R. F., Nelson, J. C., Collins, M., Moore, K. J. (2003.): Forages – an introduction to grassland farming (vol.1). Blackwell Publishing Professional. Ames, Iowa, USA.</li> <li>2. Barnes, R. F., Nelson, J. C., Moore, K. J., Collins, M. (2007.): Forages – the science of grassland agriculture (vol.2). Blackwell Publishing Professional. Ames, Iowa, USA.</li> <li>3. Erić, P., Mihailović, V., Čupina, B., Gatarić, Đ. (2004.): Krmne okopavine. Monografija. Naučni institute za ratarstvo I povrtarstvo, Novi Sad.</li> <li>4. Erić, P., Mihailović, V., Čupina, B., Mikić, A. (2007.): Jednogodišnje krmne mahunarke. Monografija. Naučni institut za ratarstvo i povrtarstvo, Novi Sad.</li> <li>5. Reheul, D., De Cauwer, B., Cugnon, M. (2010.): The Role of Forage Crops in Multifunctional Agriculture. U Boller, B., Posselt, U. K., Veronesi, F. (2010.): Fodder Crops and Amenity Grasses (Handbook of Plant Breeding volume 5). Springer Science+Business Media, LLC, New York.</li> <li>6. Stjepanović, M., Čupić, T., Gantner, R. (2012.): Grašak. Sveučilišni udžbenik. Sveučilište J. J. Strossmayera u Osijeku, Poljoprivredni fakultet u Osijeku. Osijek, Hrvatska.</li> <li>7. Stjepanović, M., Steiner, Z., Domaćinović, M., Bukvić, G. (2002.): Konzerviranje krme. Agroekološko društvo u Osijeku. Osijek, Hrvatska.</li> </ol>		

8. Stjepanović, M., Štafa, Z., Bukvić, G. (2008.): Trave za proizvodnju krme i sjemena. Sveučilišni udžbenik. Hrvatska mljekarska udruga. Zagreb, Hrvatska.
9. Stjepanović, M., Zimmer, R., Tucak, M., Bukvić, G., Popović, S., Štafa, Z. (2009.): Lucerna. Sveučilišni udžbenik. Sveučilište J. J. Strossmayera u Osijeku, Poljoprivredni fakultet u Osijeku. Osijek, Hrvatska.
10. Štafa, Z., Stjepanović, M. (2014.): Ozime i fakultativne krmne culture. Zrinski d.d., Čakovec. U postupku tiskanja.



<b>ECOLOGICAL BEEKEEPING</b>		
<b>Coordinator</b>	Zlatko Puškadija	
<b>Collaborators</b>	Marin Kovačić	
<b>Study year and semester</b>	2 <sup>nd</sup> year, III semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	(L+E+S)	75 (60L + 15E)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	To familiarize the applicant with the importance of an ecologically acceptable approach to food production. To introduce students to the legislation in organic agricultural production as well as the accompanying regulations related to beekeeping production.	
<b>Course enrolment requirements</b>	none	
<b>Intended course learning outcomes</b>		
<ol style="list-style-type: none"> <li>1. Describe the anatomy and physiology of the bee and the bee colony, distinguish between the types of hives used in Croatia.</li> <li>2. Differentiate types of honey, prepare products for everyday use from bee products.</li> <li>3. Explain and interpret the law on organic production and the accompanying regulations.</li> <li>4. Explain a year-round ecologically acceptable strategy for controlling varroosis in apiaries.</li> <li>5. Apply diagnostic methods in the control of parasitic diseases, describe the use of organic acids in bee protection.</li> <li>6. Explain the steps to meet the requirements for obtaining the organic certification label.</li> <li>7. Explain the elements of the marketing mix in the sale of organic bee products.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
Students are evaluated and graded based on the monitoring of their work, and in order to receive a final grade, the student must achieve a minimum passing grade in each individual element of monitoring and evaluation. The final exam is mandatory.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Tucak, Z., Bačić, T., Horvat, S., Puškadija, Z. (2005): Pčelarstvo, treće prošireno izdanje. Poljoprivredni fakultet, Osijek</li> <li>2. Laktić, Z., Šekulja, D. (2008): Suvremeno pčelarstvo. Nakladni zavod Globus, Zagreb</li> <li>3. Pravilnik o ekološkoj proizvodnji, NN 86/13</li> <li>4. Smjernice za „dobru pčelarsku praksu“ prema načelima HACCP sustava, Hrvatski pčelarski savez</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Kapš, Peter (2013): Liječenje pčelinjim proizvodima – Apiterapija, Geromar d.o.o., Bestovje</li> <li>2. Goodman, L. (2003): Form and function in the honey bee, International Bee Research Association, Cardiff</li> <li>3. Winston, M.L. (1987): The biology of the honey bee, Harvard University Press, USA.</li> </ol>		

<b>ECOLOGICAL VEGETABLE GROWING</b>		
<b>Coordinator</b>	Miro Stošić	
<b>Collaborators</b>	Boris Ravnjak	
<b>Study year and semester</b>	2 <sup>nd</sup> year, III semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	(L+E+S)	75 (30L + 30E + 15S)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	To familiarize students with the principles of ecological production and vegetable care in open fields and protected areas, as well as with the prescribed measures and methods in accordance with existing laws and regulations.	
<b>Course enrolment requirements</b>	none	
<b>Intended course learning outcomes</b>		
<ol style="list-style-type: none"> <li>1. Describe the characteristics, position, and importance of ecological agriculture in relation to other agricultural management systems.</li> <li>2. Recommend forms and argue the advantages of growing crops without the use of agrochemicals.</li> <li>3. Identify the advantages and disadvantages of different technologies in vegetable production (conventional – ecological).</li> <li>4. Explain the framework guidelines for standardization and recognition of ecological agricultural products.</li> <li>5. Organize work and independently manage technological processes in ecological vegetable production on one's own farm, as well as in larger production systems.</li> <li>6. Independently present information, problems, and solutions related to ecological vegetable production.</li> <li>7. Critically and analytically think about vegetable production.</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 lectures. In the second part of the semester, fieldwork will be organized. Attendance at fieldwork is obligatory. During the semester, two partial written exams will be held. The final exam is obligatory, and a positive 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. Lešić, R., Borošić, J., Buturac, M., Ćustić, M., Poljak, Romić, D. (2002.): Povrčarstvo. Zrinski d.d., Čakovec:1-627.</li> <li>2. Kisić I. (2013.):Uvod u ekološku poljoprivredu, Agronomski fakultet Sveučilišta u Zagrebu, Grafički zavod Hrvatske d.o.o.</li> <li>3. Parađiković, N. (2014.): Opće i specijalno povrčarstvo – online skripta, Poljoprivredni fakultet u Osijeku</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Kisić I. (2013.):Uvod u ekološku poljoprivredu, Agronomski fakultet Sveučilišta u Zagrebu, Grafički zavod Hrvatske d.o.o.</li> <li>2. Znaor, D. (1996.): Ekološka poljoprivreda. Nakladni zavod Globus. Zagreb.</li> <li>3. Zakonska regulativa u ekološkoj poljoprivredi</li> </ol>		

<b>ECONOMICS OF PROCESSING</b>		
<b>Coordinator</b>	Snježana Tolić	
<b>Collaborators</b>	none	
<b>Study year and semester</b>	2 <sup>nd</sup> year, III semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	(L+E+S)	75 (30L + 30E + 15S)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	Acquiring theoretical knowledge in the field of agricultural product processing economics, as well as methods and useful tools that assist in making business decisions. Protection and management of intellectual property and quality management as factors in achieving sustainable development and competitiveness.	
<b>Course enrolment requirements</b>	none	
<b>Intended course learning outcomes</b>		
<ol style="list-style-type: none"> <li>1. Choose the appropriate processing technology.</li> <li>2. Choose the appropriate packaging.</li> <li>3. Assess the financial impact of the entrepreneurial venture.</li> <li>4. Choose a strategy for protecting intellectual property.</li> <li>5. Choose an appropriate quality management system.</li> <li>6. Analyze the environmental impact of the project and choose an environmental impact management system.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
During the semester, 3 partial exams will be held. Continuous monitoring of classes (activity in classes, preparation for classes, reflective review of course content), results of partial knowledge tests, seminar papers and written exams will be taken into account when forming the final grade of students. Attendance is mandatory according to the Regulations on study and studying at J.J. Strossmayer University in Osijek. The final exam is obligatory.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Fellows, P., Franco, E., Rios, W. (1996) Starting a Small Food Processing Enterprise, Intermediate Tecnology Publications</li> <li>2. Groupe of authors (2002) Od ideje do profita - vodič za inovatore-poduzetnike. MOMSP i HSI, Zagreb</li> <li>3. ISO (2004) Guidance on the concept and use of the process approach for management system</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Shy, O. (1995) Industrial organization: Theory and application. MIT Press, Massachusets</li> <li>2. Carlton, D.; Perloff, J.M. (1994) Modern industrial organization. Harper Collins College Publisher, New York</li> <li>3. Milgrom, P., Roberts, J. (1992) Economics, Organization and Management. Prentice Hall International Editions, Englewood Cliffs</li> <li>4. Nordström, K.A., Ridderstråle J. (2002) Funky Business: kapital pleše samo s darovitima. Differo, Zagreb</li> </ol>		

<b>ETOLOGY OF ANIMALS</b>		
<b>Coordinator</b>	Pero Mijić	
<b>Collaborators</b>	Boris Antunović Mirjana Baban Tina Bobić Maja Gregić	
<b>Study year and semester</b>	2 <sup>nd</sup> year, III semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	(L+E+S)	75 (30L+15 E+30S)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	Familiarize students with the theoretical basis of mechanisms for controlling the behavior of domestic animals in functional processes. Train them to observe the behavior of animals from different levels of domestication and breeds. Explore the possibility of applying methods for assessing animal behavior in practice, breeding, and their use.	
<b>Course enrolment requirements</b>	none	
<b>Intended course learning outcomes</b>		
<ol style="list-style-type: none"> <li>1. Explain the basic mechanisms of physiological and ethological behavior in domestic animals,</li> <li>2. Describe and recognize behavioral patterns in functional processes,</li> <li>3. Point out errors in handling animals,</li> <li>4. Understand and predict the behavior of domestic animals during feeding, drinking, defecation, urination, resting, grazing, sleeping, playing, and reproduction,</li> <li>5. Recognize possible disorders in the behavior of domestic animals,</li> <li>6. Recommend minimum conditions for fulfilling animal welfare requirements,</li> <li>7. From the studied seminar paper, critically assess the latest scientific and professional literature findings and draw conclusions.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
<p>Forms of monitoring and checking students' knowledge will be written and oral.</p> <p>When forming the final grade of students, continuous monitoring of classes (activity in class, preparation for the lesson, reflective repetition of teaching content), continuous monitoring and knowledge verification (partial exams) and the final oral exam will be taken into account. Attendance is obligatory in accordance with the Regulations on study and studying at J.J. University. Strossmayer in Osijek. If a student misses more than 30% of classes (more than 4 times), he loses the right to take the final exam. The final exam is obligatory.</p>		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Jensen, P. (2014): Ponašanje domaćih životinja, prema 2. engl. izdanju. Uvodni tekst. Struč. ur. hr. izdanja: Pavičić, Ž. i Matković, K. Veterinarski fakultet Sveučilišta u Zagrebu, Zagreb.</li> <li>2. Fraser, A. F., Broom, D. M. (1998): Farm animal behaviour and welfare. Third edition. CAB International, Oxon, New York.</li> <li>3. Vučinić, M. (2006): Ponašanje, dobrobit i zaštita životinja. Veterinarska komora Srbije, Beograd.</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Hulsen, J. (2007): Cow Signals. Roothbont, Natherlands.</li> <li>2. Knierim, U. (2002): Grundsätzliche ethologische Überlegungen zur Beurteilung der Tiergerechtheit bei Nutztieren. Dtsch. Tierärztl. Wschr. 109, 261-266.</li> <li>3. Sambrus, H. H. (1978): Nutztierethologie. Verlag Paul Parey, Berlin-Hamburg.</li> </ol>		

<b>PHYTOECOLOGY</b>		
<b>Coordinator</b>	Edita Štefanić	
<b>Collaborators</b>	Sanda Rašić	
<b>Study year and semester</b>	2 <sup>nd</sup> year, III semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	(L+E+S)	75 (45L + 30E)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	Familiarize students with contemporary phytosociological research and the possibility of applying it in the agronomy profession.	
<b>Course enrolment requirements</b>	none	
<b>Intended course learning outcomes</b>		
<ol style="list-style-type: none"> <li>1. Understand the plant life cycle</li> <li>2. Interpret species interactions in ecosystems</li> <li>3. Evaluate the significance of ecological factors for plants</li> <li>4. Describe plant communities in anthropogenic ecosystems</li> <li>5. Analyze the impact of ecological factors on plant communities</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
The right to take the final exam is earned by collecting a minimum number of grading points. Grading points are earned based on class attendance (minimum 70%), classroom activity, and grades from partial knowledge assessments. During the semester, students take two partial knowledge assessments. The final exam is obligatory, and a positive grade on the final exam is a prerequisite for taking the oral exam.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Barbour, M.G., Burk, J.H., Pitts, W.D. (1987): Terrestrial plant ecology. The Benjamin/Cummings Publishing Company, Inc.</li> <li>2. Kent, M., Coker, P. (1985): Vegetation description and analysis: A practical approach. CRC Press Boca Raton Ann Arbor.</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Gračanin Ilijanić 1977): Uvod u ekologiju bilja. Školska knjiga, Zagreb</li> </ol>		

<b>GENE BANKS</b>		
<b>Coordinator</b>	Vlado Guberac	
<b>Collaborators</b>	Vedran Orkić	
<b>Study year and semester</b>	2 <sup>nd</sup> year, III semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	(L+E+S)	75 (35 L+ +40 S)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	Introduce students to the importance of gene banks at the national level and the significance of biodiversity in plant breeding.	
<b>Course enrolment requirements</b>	none	
<b>Intended course learning outcomes</b>		
<ol style="list-style-type: none"> <li>1. Plan the process of collecting, evaluating, and conserving plant genetic resources</li> <li>2. Apply methods for conserving plant genetic resources</li> <li>3. Analyze the principles of resource management in gene banks</li> <li>4. Analyze the socio-economic aspects of the protection and utilization of plant genetic resources</li> <li>5. Comment on, argue, and critically assess the assigned topic in the field of gene banks</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
<p>In the formation of the final grade for students, continuous monitoring of teaching (classroom activity, preparation for lessons, reflective review of the course content), the seminar paper, and the oral exam are considered. The evaluation of the seminar paper includes clarity, accuracy, and relevance of the information in the written seminar, as well as the overall (technical and visual) quality of the presentation. Attendance is obligatory according to the Regulations on Studies and Studying at the J.J. Strossmayer University in Osijek. The final exam is obligatory.</p>		
<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.</li> <li>2. Martinčić, J., Marić, S. (1996): Oplemenjivanje bilja. Vježbovnik. Sveučilište u Osijeku</li> <li>3. Fenner, M. (1993): Seeds. CAB International</li> <li>4. Hodgkin, T., Brown, A.H.D., van Hintum, Th.J.L., Morales, E.A.V. (1995): Core collections of plant genetic resources. Wiley and Sons.</li> <li>5. Black, M, Bewley Derek J., Halmer, P (2008): The Encyclopedia of Seeds.CABI International.</li> <li>6. Milošević, M., Kobiljski, B. (2011): Semearstvo I-III. Monografija. Institut za ratarstvo i povrtarstvo. Novi Sad.</li> <li>7. During the course, the latest works published in reference international journals will be selected to serve as preparation for the seminar</li> </ol>		
<b>Additional literature</b>		
4. none		

<b>PHYTOECOLOGY</b>		
<b>Coordinator</b>	Edita Štefanić	
<b>Collaborators</b>	Sanda Rašić	
<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 (45L + 30P)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	To familiarize students with contemporary phytoecological research and its potential applications in the field of agronomy.	
<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. Understand the life cycle of a plant.</li> <li>2. Interpret species interactions within ecosystems.</li> <li>3. Evaluate the significance of ecological factors for plants.</li> <li>4. Describe plant communities in anthropogenic ecosystems.</li> <li>5. Analyse the impact of ecological factors on plant communities.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
The right to take the final exam is granted by achieving the minimum required number of assessment points. Assessment points are earned through class attendance (at least 70%), participation in class activities, and grades from partial knowledge assessments. During the semester, students take two partial knowledge assessments. The final exam is mandatory, and a passing grade on the final exam is a prerequisite for an overall passing grade in the course.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Barbour, M.G., Burk, J.H., Pitts, W.D. (1987): Terrestrial plant ecology. The Benjamin/Cummings Publishing Company, Inc.</li> <li>2. Kent, M., Coker, P. (1985): Vegetation description and analysis: A practical approach. CRC Press Boca Raton Ann Arbor.</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Gračanin Ilijanić 1977): Uvod u ekologiju bilja. Školska knjiga, Zagreb</li> </ol>		

<b>GENOMICS IN ZOOTECHNIQUE</b>		
<b>Coordinator</b>	Ivona Djurkin Kušec	
<b>Collaborators</b>	Goran Kušec Vladimir Margeta	
<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 (L- 65, S-10)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	To familiarize students with molecular genetics methods and their application in animal science, as well as the possibilities of integrating them with classical methods of population and quantitative genetics.	
<b>Course enrolment requirements</b>	No prerequisites	
<b>Intended course learning outcomes</b>		
<ol style="list-style-type: none"> <li>1. Identify molecular methods used in genome analysis that are applicable in animal science.</li> <li>2. Describe different genetic maps and genetic markers.</li> <li>3. Explain candidate and major genes.</li> <li>4. Define and compare marker-assisted selection, genomic selection, and GWAS (Genome-Wide Association Studies).</li> <li>5. List and describe various methods based on polymerase chain reaction (PCR).</li> <li>6. Apply the acquired knowledge and critically discuss a given topic in genomics related to livestock production.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
Students are expected to regularly attend classes and actively engage in lectures. In the second part of the course, students independently prepare a seminar paper based on selected studies related to the application of molecular methods in various areas of animal science (e.g., quality of animal products, animal growth and development, reproduction, biodiversity, breed conservation, etc.). Students present their seminar papers to the lecturer and their peers in the form of a PowerPoint presentation or a poster. The exam can be prepared using the required literature and the notes taken during lectures.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Lewin, B. Genes VII. Oxford University Press. 2000.</li> <li>2. Ambriović Ristov, A., Brozović, A., Bruvo, Mađarić, B., Četković, H., Herak Bosnar, M., Hranilović, D., Katušić Hećimović, S., Meštrović Radan, N., Mihaljević, S., Slade, N., Vujaklija, D. Metode u molekularnoj biologiji. Sveučilište u Zagrebu. 2007.</li> <li>3. Hall, Stephen JG. Livestock biodiversity: genetic resources for the farming of the future. John Wiley &amp; Sons, 2008.</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Falconer, D.S. and Mackay, T.F.: Introduction to quantitative genetics, Logmann Group Ltd. 1996.</li> <li>2. Rotschild, F.M. and Ruvinsky, A. The genetics of the pig. 2nd ed. CAB International. 2011.</li> <li>3. Toldrá, F. Meat Biotechnology. Springer Science and Business Media, LLC. 2008.</li> <li>4. Rotschild, F.M. and Ruvinsky, A. The genetics of the pig. 2nd ed. CAB International. 2011.</li> <li>5. Allendorf FW, Luikart GH, Aitken SN. Conservation and the genetics of populations. John Wiley &amp; Sons; 2012</li> </ol>		



<b>GEOINFORMATION SYSTEMS AND ANALYSIS OF SPATIAL DATA</b>		
<b>Coordinator</b>	Mladen Jurišić	
<b>Collaborators</b>	Dorijan Radočaj	
<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)	L- 35, P-25, S – 15 = 75
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	<p>To familiarize students with the application of GIS technologies, remote sensing in agriculture, and precision (sustainable) management.</p> <p>To introduce students to global information systems, such as CORINE, IACS-LPIS, and ARKOD-AGRONET, including their composition, functionality, and management.</p> <p>Through seminar work, students will be trained to independently create thematic maps using digital base maps, work with GIS software, (D)GPS systems, and utilize navigation for tractor and machinery operations.</p>	
<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 fundamental principles and components of GIS and explain its functioning.</li> <li>2. Explain and present (D)GPS and GPS systems and interpret the basics of the Land Information System (LIS).</li> <li>3. Explain the creation of thematic maps in agriculture, particularly land use maps for agricultural crops.</li> <li>4. Describe regionalization and branding in a GIS environment, outline its possibilities, and present the application of geospatial data and geostatistics basics, including spatial modelling.</li> <li>5. Present the fundamentals of remote sensing in agriculture and environmental protection and analyse case studies.</li> <li>6. Explain precision agriculture and outline practical aspects, including map creation approaches and sensor-based methods.</li> <li>7. Interpret the majority of agrotechnical operations within precision agriculture systems.</li> <li>8. Interpret organized GIS systems at the national level (e.g., CORINE, LPIS – Arkod – Agronet) and resource inventory.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
<p>The right to take the final exam is granted by achieving the minimum required number of assessment points. Assessment points are earned through class attendance (at least 70%), participation in class activities, and grades from partial exams. During the semester, students take partial exams. 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 conducted orally.</p>		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Jurišić M., Plaščak I. (2009): Geoinformacijski sustavi GIS u poljoprivredi i zaštiti okoliša, Poljoprivredni fakultet Osijek.</li> <li>2. Jurišić M., Glavaš J., Plaščak I., Antonić O., Radočaj D. (2021): Geoinformacijske tehnologije GIS u ekonomiji, Fakultet agrobiotehničkih znanosti Osijek.</li> <li>3. Radočaj D., Jurišić M., Plaščak I. (2021): Geoinformacijske tehnologije GIS u poljoprivredi i zaštiti okoliša - Praktikum, Fakultet agrobiotehničkih znanosti Osijek.</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Burrough P. A., McDonnell R. A. (2006): Principles of Geographical Information Systems – Spatial Information Systems and Geostatistics, Oxford University Press., UK.</li> </ol>		

<b>HYDRAULIC DEVICES OF AGRICULTURAL MACHINES</b>		
<b>Coordinator</b>	Goran Heffer	
<b>Collaborators</b>	Ivan Vidaković Goran Pačarek	
<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 (45L+30P)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	To familiarize students with the elements and components of hydraulic systems, hydraulic drives, and their applications in agricultural machinery. To develop an engineering and scientific approach in students for analysing the functioning of machines and devices in agriculture.	
<b>Course enrolment requirements</b>	Engineering mechanics II	
<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 method of power transmission in hydraulic systems.</li> <li>2. Identify and interpret sources of hydraulic energy.</li> <li>3. Identify and explain the operation of the main hydraulic components in a system.</li> <li>4. Differentiate control components in hydraulic systems.</li> <li>5. Describe auxiliary devices in a hydraulic system.</li> <li>6. Describe logic circuits and types of control, and connect hydraulic components into simple systems.</li> <li>7. Identify and explain the working fluids used in hydraulic systems.</li> <li>8. Explain the maintenance of hydraulic systems.</li> <li>9. Apply acquired knowledge to analyse hydraulic systems in tractors, combines, and other agricultural machinery.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
Attendance and active participation in lectures and exercises, completion of one programming assignment, two partial exams, and one final written exam. In addition to the 75 hours spent in class, students are expected to dedicate a minimum of 75 hours for studying the material and completing the programming assignment.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Vujčić, M.: Inženjerska mehanika II, Poljoprivredni fakultet Osijek (interna skripta)</li> <li>2. Koroman, V., Mirković, R. (1991): Hidraulika i pneumatika, Školska knjiga, Zagreb</li> <li>3. Vujčić, M (2003): Hidraulika (nastavni materijal), Poljoprivredni fakultet Osijek</li> <li>4. Pirija, I. (1983): Traktor, Nolit, Beograd</li> <li>5. Brkić, D., Vujčić, M., Šumanovac, L. (2002): Strojevi za žetvu i berbu zrnatih plodina, Poljoprivredni fakultet Osijek, Vinkovci</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Petrić, J. (2012): Hidraulika i pneumatika, 1. dio – Hidraulika, FSB Zagreb</li> <li>2. Korbar, R. (2007): Hidraulika i pneumatika, Veleučilište u Karlovcu</li> <li>3. Šestan, A (2003.): Uljna hidraulika i pneumatika, Pomorski fakultet Sveučilišta u Rijeci</li> <li>4. Esposito, A. (2008): Fluid Power with Applications, Prentice-Hall, Upper Saddle River, NJ</li> <li>5. Lift, H. (1992): Hydraulik in der Landtechnik, Vogel Buchverlag, Würzburg</li> <li>6. Articles in journals and promotional materials from manufacturers of hydraulic components.</li> </ol>		

<b>IT IN AGRICULTURE</b>		
<b>Coordinator</b>	Dražen Horvat	
<b>Collaborators</b>	Andrijana Rebekić	
<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 (35L + 35P + 5S)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	To familiarize students with techniques and skills for using computers and information and communication (ICT) technologies in business applications and agro-economic research.	
<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. Apply mobile communications and network protocols in internet-based business operations.</li> <li>2. Utilize various forms of networked business solutions and software in modern office and remote business practices, as well as in marketing.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
<p>In determining the final grade, continuous class participation (engagement in class activities, preparation for lessons, and reflective analysis of course content), continuous monitoring and assessment of knowledge (partial exams), and the final oral exam are taken into account. Attendance at partial exams is not mandatory, nor is the final written exam if the student passes both partial exams. The oral exam is mandatory for all students. Class attendance is compulsory in accordance with the Regulations on Studies and Studying at the J.J. Strossmayer University of Osijek. If a student is absent for more than 30% of class hours (more than four times), they lose the right to obtain a signature.</p>		
<b>Obligatory literature</b>		

<b>INTEGRATED FERTILIZATION</b>		
<b>Coordinator</b>	Boris Đurđević	
<b>Collaborators</b>	Irena Jug Vesna Vukadinović	
<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)	L-75
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	The module aims to provide students with an understanding of the basic principles of integrated fertilization and to explain the significance of fertilization as the most important agronomic measure in organic production. It introduces students to modern methods for calculating fertilization recommendations that comply with the regulations of integrated crop production (applying fertilizers in quantities that match crop needs, soil fertility, profitability, and input costs while considering environmental protection and potential yield).	
<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. To define the importance of soil analysis as a basis for creating fertilization recommendations and monitoring crop fertilization.</li> <li>2. To apply principles of sustainability (increasing yield while reducing soil degradation).</li> <li>3. To apply and compare modern methods for calculating fertilization recommendations that comply with integrated crop production regulations.</li> <li>4. To compare different methods for preventing excessive contamination of groundwater and drinking water with nitrates.</li> <li>5. To define various legal regulations (e.g., the Nitrate Directive) both locally and globally.</li> <li>6. To identify indicators of soil pollution in agriculture.</li> <li>7. To define and explain the importance of methods for preventing soil contamination.</li> <li>8. To outline procedures to be undertaken in case of soil contamination.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
<p>Students are expected to regularly attend classes and actively participate in discussions during lectures and exercises. After completing each thematic unit, students take a partial exam. Students are encouraged to take notes during lectures and prepare for exams using the required literature. PowerPoint presentations will be used during lectures to assist in explaining the topics being discussed. Printed handouts of the presentations will be made available to students.</p> <p>In determining the final grade, continuous class participation (engagement in class activities, preparation for lessons, and reflective analysis of course content) and passing the partial or final exam are taken into account. Attendance is mandatory in accordance with the Regulations on Studies and Studying at the J.J. Strossmayer University of Osijek. If a student is absent for more than 30% of class hours, they lose the right to obtain a signature.</p>		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Vukadinović, V., Vukadinović, V. (2011.): Ishrana bilja. Poljoprivredni fakultet u Osijeku. Osijek</li> <li>2. Jug, I., Jug, D., Brozović, B., Vukadinović, V., Đurđević, B. (2022): Osnove tloznanstva i biljnje proizvodnje. Fakultet agrobiotehničkih znanosti Osijek, Osijek, Hrvatska.</li> <li>3. Vukadinović, V., Bertić, B. (2013.): Filozofija gnojidbe – Sve što treba znati o gnojidbi, udžbenik. Autorska naklada, Osijek.</li> </ol>		

4. Đurđević, Boris (2014): Praktikum iz ishrane bilja. Osijek: Poljoprivredni fakultet u Osijeku, 2014 (priručnik)
5. Vukadinović, V. (Internet): Kalkulatori. <http://ishranabilja.com.hr/kalkulatori.html>
6. Đurđević, Boris; Jug, Irena; Jug, Danijel; Vukadinović, Vesna; Stipešević, Bojan; Brozović, Bojana (2017): Primjena biogljena kao kondicionera tla – korak ka održivoj biljnoj proizvodnji. Osijek: Vijeće za istraživanja u poljoprivredi; Ministarstvo poljoprivrede.
7. Pravilnik o dobroj poljoprivrednoj praksi u korištenju gnojiva, NN 163/03, NN 40/07
8. Pravilnik o zaštiti poljoprivrednog zemljišta od onečišćenja, NN 152/08

**Additional literature**

1. Marschner, H. (1995): Mineral nutrition of higher plants, Academic Press
2. Implementation of nitrates Directive, available at: [http://ec.europa.eu/environment/water/water-nitrates/index\\_en.html](http://ec.europa.eu/environment/water/water-nitrates/index_en.html)

<b>TESTING OF SEED QUALITY</b>		
<b>Coordinator</b>	Tihana Teklić	
<b>Collaborators</b>	Vlado Guberac Miroslav Lisjak	
<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)	L-55, P-20 = 75
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	To familiarize students with the key quality indicators of seed material and the methods for assessing purity, germination, vigour, and other relevant seed properties.	
<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. Interpret the quality of seed material based on defined criteria in legal regulations and accepted protocols.</li> <li>2. Differentiate seed quality indicators and compare various methods of their determination.</li> <li>3. Evaluate seed quality using standard and recommended tests.</li> <li>4. Integrate theoretical knowledge with practical procedures for analysing seed quality indicators.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
Attendance and active participation in lectures and practical exercises, two partial knowledge assessments, a seminar paper, and a written/oral exam.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Guberac, V. (2000): Sjemenarstvo ratarskih kultura. Skripta, Fakultet agrobiotehničkih znanosti Osijek.</li> <li>2. Teklić, T. (2012): Ispitivanje kakvoće sjemena. Skripta, Fakultet agrobiotehničkih znanosti Osijek.</li> <li>3. Kastori, R. (1984): Fiziologija semena. Matica srpska, Novi Sad.</li> <li>4. Ministarstvo poljoprivrede RH (2008): Pravilnik o metodama uzorkovanja i ispitivanja kvalitete sjemena. NN 140/05, 35/08</li> <li>5. Hampton, J. G., Te Krony, D. M. (1995): Handbook of vigour test methods. ISTA, Zürich.</li> <li>6. Lisjak, M., Špoljarević, M., Agić, D., Andrić, L. (2009): Praktikum iz fiziologije bilja. Fakultet agrobiotehničkih znanosti Osijek.</li> </ol>		
<b>Additional literature</b>		
Thematic scientific and expert papers (Seed Science and Technology, Seed Science Research, Sjemenarstvo, Poljoprivreda etc.)		

<b>COMPOSING OF FERTILIZATION RECOMMENDATIONS IN HORTICULTURE</b>		
<b>Coordinator</b>	Brigita Popović	
<b>Collaborators</b>	Ružica Lončarić	
<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)	L- 40, P-10, S-25
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	To familiarize students with the principles and systems of fertilization in horticulture, as well as the basic aspects of modelling fertilization for vegetables and flowers. Additionally, to familiarize them with the methodology for calculating optimal fertilization rates for horticultural species, the specificity of vegetables and flowers fertilization, the properties and types of fertilizers, methods of fertilizer application, and cost calculations.	
<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. Interpret the principles and systems of fertilization for orchards and vineyards.</li> <li>2. Explain the specific requirements of fertilization for different groups of permanent crops.</li> <li>3. Interpret the principles and systems of fertilization in vegetable and flower cultivation.</li> <li>4. Explain the specific fertilization requirements for different groups and types of vegetables.</li> <li>5. Interpret the elements of the economic impact of fertilization in horticulture.</li> <li>6. Analyse the economic impact of fertilization in horticulture.</li> <li>7. Calculate recommendations for optimal fertilization of permanent crops and vegetables considering production conditions.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
The right to take the final exam is granted upon accumulating a minimum number of assessment points. Assessment points are earned based on class attendance (minimum 70%), participation in class activities, and grades from partial exams. During the semester, students take two partial exams, scheduled one week after completing the thematic unit. Students are also required to prepare a seminar paper involving nutrient balancing in vegetable and/or flower production. 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 conducted orally.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Vinković, T., Popović, B., Stošić, M., Lončarić, Z., Kristek, S., Ivezić, V., Tkalec Kojić, M., Jović, J., Ravnjak, B. (2019): Okolišno prihvatljiva proizvodnja povrća. Osijek: Fakultet agrobiotehničkih znanosti Sveučilišta Josipa Jurja Strossmayera u Osijeku.</li> <li>2. Lončarić, Z.; Parađiković, N.; Popović, B.; Lončarić, R.; Kanisek, J. (2015): Priručnik Gnojidba povrća, organska gnojiva i kompostiranje.</li> <li>3. Bergmann, W. (1983): Ernährungsstörungen bei Kulturpflanzen. Entstehung und Diagnose. VEB, Gustav Fischer Verlag Jena, Deutschland. - for the thematic units: 1,2</li> <li>4. Computer programs (software) for determining fertilization recommendations (developed by the lecturers) - for the thematic units: 3,4,7</li> <li>5. Professional and scientific publications by the lecturers for the thematic units: 5, 6</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Lešić, R., Borošić, J., Buturac, I., Čustić, M., Poljak, M., Romić, D. (2002): Povrčarstvo. Udžbenici Sveučilišta u Zagrebu. - for the thematic unit: 2</li> <li>2. Scaife, A., Turner, M. (1983): Diagnosis of Mineral Disorders in Plants. Volume 2. Vegetables. Ministry of Agriculture Fisheries and Food. London. UK. - for the thematic unit: 2</li> <li>3. Winsor, G., Adams, P. (1987): Diagnosis of Mineral Disorders in Plants. Volume 3. Glasshouse Crops. Ministry of Agriculture Fisheries and Food. London. UK. - for the thematic units: 2,3</li> </ol>		

<b>COMPOSING OF FERTILIZATION RECOMMENDATIONS IN CROP PRODUCTION</b>		
<b>Coordinator</b>	Boris Đurđević	
<b>Collaborators</b>	Irena Jug	
<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)	L-55, P-20
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	To introduce students with methods for determining fertilization needs based on soil and/or plant chemical analysis, taking into account crop requirements, climatic and soil conditions, and the potential or planned yield, while considering the environmental impact. Emphasis is placed on a scientific and professional approach to fertilization, rationalization, and profitability of primary production while preserving the environment.	
<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 and compare standard methods for determining fertilization needs (mineral, organic, and green fertilization).</li> <li>2. Define and explain chemical methods for soil and plant material analysis.</li> <li>3. Analyse and apply computer-based methods for determining fertilization needs using analytical and other data related to plant species, soil, climate, agro-technics, and more.</li> <li>4. Develop and utilize interpretive databases.</li> <li>5. Link relevant production attributes and fertilization calculations using GIS tools.</li> <li>6. Visually present fertilization calculation results on thematic maps.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
<p>Students are expected to attend classes regularly and actively participate in discussions during lectures and exercises. After completing each thematic unit, students take a partial exam. It is recommended that students take notes during lectures and prepare for exams using mandatory literature.</p> <p>The final grade for students is determined by continuous monitoring of their performance (class participation, preparation for lessons, reflective reviews of the content) and by passing the partial or final exam.</p> <p>Attendance is mandatory in accordance with the Regulations on Studies and Studying at Josip Juraj Strossmayer University of Osijek. If a student is absent for more than 30% of the total class hours, they lose the right to obtain a signature.</p>		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Vukadinović, V., Vukadinović, V. (2011.): Ishrana bilja. Poljoprivredni fakultet u Osijeku. Osijek</li> <li>2. Jug, I., Jug, D., Brozović, B., Vukadinović, V., Đurđević, B. (2023): Osnove tloznanstva i biljne proizvodnje. Fakultet agrobiotehničkih znanosti Osijek, Osijek, Hrvatska.</li> <li>3. Vukadinović, V., Bertić, B. (2013.): Filozofija gnojidbe – Sve što treba znati o gnojdbi. Autorska naklada, Osijek.</li> <li>4. Đurđević, Boris (2014): Praktikum iz ishrane bilja. Osijek, Poljoprivredni fakultet u Osijeku.</li> <li>5. Vukadinović, V. (Internet): Kalkulatori. <a href="http://ishranabilja.com.hr/kalkulatori.html">http://ishranabilja.com.hr/kalkulatori.html</a></li> <li>6. Đurđević, Boris; Jug, Irena; Jug, Danijel; Vukadinović, Vesna; Stipešević, Bojan; Brozović, Bojana (2017): Primjena biougljena kao kondicionera tla – korak ka održivoj biljnoj proizvodnji. Osijek: Vijeće za istraživanja u poljoprivredi, Ministarstvo poljoprivrede.</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Marschner, H. (1995): Mineral nutrition of higher plants, Academic Press</li> <li>2. Ruß, G., Kruse, R., Schneider, M., Wagner, P. (2009). Visualization of Agriculture Data Using Self-Organizing Maps. In: Allen, T., Ellis, R., Petridis, M. (eds) Applications and Innovations in Intelligent Systems XVI. SGA1 2008. Springer, London</li> </ol>		



<b>CHANNELS OF AGRICULTURAL FOOD PRODUCTS DISTRIBUTION</b>		
<b>Coordinator</b>	Ružica Lončarić	
<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)	L-50, S-25 = 75
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	To provide students with the necessary knowledge about types of distribution channels and the physical distribution of agricultural and food products.	
<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 importance of distribution channels in modern market conditions.</li> <li>2. Define and analyse the role of intermediaries in the agricultural and food production sector.</li> <li>3. Explain physical distribution.</li> <li>4. Define and explain the functions, types, dynamics, and integration of distribution channels.</li> <li>5. Interpret the forms of connectivity within distribution channels.</li> <li>6. Interpret market institutions and sales channels in the Republic of Croatia.</li> <li>7. Analyse supporting institutions in the agricultural market.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
<p>The right to take the final exam is granted upon accumulating a minimum number of assessment points. Assessment points are earned through class attendance, participation in class activities, tasks during lectures and seminars, seminar evaluations, and grades from partial exams. During the semester, students are required to independently prepare a mandatory seminar paper. Additionally, students take two partial exams during the course. The final exam is mandatory, and a passing grade on the final exam is a prerequisite for a positive final grade. The final exam may be written or oral.</p>		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Tolušić, Z. (2012): Tržište i distribucija poljoprivredno-prehramenih proizvoda. Josip Juraj Strossmayer University of Osijek. Faculty of Agriculture, Osijek.</li> <li>2. Segetlija, Z., Lamza-Maronić, M. (2000): Distribucija, logistika, informatika. Josip Juraj Strossmayer University of Osijek. Faculty of Economics and Business, Osijek.</li> <li>3. Kotler, Ph. (1999): Marketing management, Informator, Zagreb</li> </ol>		
<b>Additional literature</b>		

<b>MAPPING AND SOIL DISTANT RESEARCHES</b>		
<b>Coordinator</b>	Vesna Vukadinović	
<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 (50L + 25P)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	Students are introduced to the basics of soil cartography and remote sensing, methods of representing an area or information about it, map creation, projections, and scales. They learn to represent landforms and other features using drawings, colors, symbols, and labels according to an established key. Additionally, they study photogrammetry and remote sensing as modern methods for collecting soil information and interpreting the data obtained through these methods.	
<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. Present the process of creating soil maps.</li> <li>2. Explain the role of photogrammetry and remote sensing in soil science.</li> <li>3. Describe the role and application of GIS tools in soil research.</li> <li>4. Collect and interpret data on the morphological, physical, and chemical properties of a specific plot.</li> <li>5. Display the properties of investigated land plots on a large-scale map.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
Students who accumulate the minimum required number of assessment points during the semester are eligible to take the final exam. Assessment points are earned based on class attendance (minimum 70%), participation in class activities, and grades from partial exams. During the semester, students take two partial exams (in the 6th and 15th weeks of classes). The final exam is mandatory and consists of both written and oral components. A passing grade on the final exam is a prerequisite for obtaining a positive final grade.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Martinović, J. (1997): Tloznanstvo u zaštiti okoliša, priručnik za inženjere. DUZO. Zagreb.</li> <li>2. Martinović, J. (2000): Tla u Hrvatskoj. DUZPO. Zagreb.</li> <li>3. Jurišić, M., Plaščak, I. (2009): Geoinformacijski sustav, GIS u poljoprivredni i zaštiti okoliša. Poljoprivredni fakultet u Osijeku. Osijek.</li> <li>4. Tutić, D., Vučetić, N., Lapaine. M. (2004): Uvod u GIS. Sveučilište u Zagrebu, Geodetski fakultet. Zagreb.</li> <li>5. Benka, P., Bezdán, A. (2016): Geografski informacijski sustavi. Poljoprivredni fakultet Novi Sad, Univerzitet u Novom Sadu. Novi Sad.</li> <li>6. <a href="http://www.kartografija.hr/old_hkd/obrazovanje/prirucnici/Uvod_u_GIS.pdf">www.kartografija.hr/old_hkd/obrazovanje/prirucnici/Uvod_u_GIS.pdf</a></li> <li>7. Lovrić, P. (1988): Opća kartografija. Sveučilišna naklada Liber. Zagreb.</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Bogunović, M. (1994): Pedološko kartiranje. Agronomski fakultet Sveučilišta u Zagrebu - interna skripta.</li> <li>2. Lapaine, M. (2002): Kartografske projekcije. <a href="http://www.kartografija.hr/old_hkd/projekcije_dugo.pdf">www.kartografija.hr/old_hkd/projekcije_dugo.pdf</a></li> <li>3. Frančula N. (2004): Digitalna kartografija - treće prošireno izdanje. Sveučilište u Zagrebu, Geodetski fakultet. Zagreb.</li> <li>4. Kostić, M. M. (2021): Precizna poljoprivreda. Poljoprivredni fakultet Novi Sad, Univerzitet u Novom Sadu. Novi Sad.</li> <li>5. Topić, J., Ilijanić, Lj., Tvrtković, N., Nikolić, T. (2006): Staništa, Priručnik za inventurizaciju, kartiranje i praćenje stanja. Državni zavod za zaštitu prirode. Zagreb.</li> <li>6. Pavlopoulos, K., Evelpidou, N., Vassilopoulos, A. (2009): Mapping Geomorphological Environments. e-ISBN 978-3-642-01950-0. Springer Dordrecht Heidelberg New York London.</li> <li>7. Kraus, K. (2006): Fotogrametrija - 1. dio, osnove i standardni procesi. Synopsis.</li> </ol>		

<b>COMPUTER SYSTEMS OF DECISION</b>		
<b>Coordinator</b>	Zdenko Lončarić	
<b>Collaborators</b>	Jasenska Ćosić Mirjana Brmež Ružica Lončarić	
<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)	L-45, P-5, S-25 = 75
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	Using information technology, students are introduced to the basics of creating computer-based decision-making systems. They develop decision-making systems focusing on fertilization, plant protection, and the economic efficiency of 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. Explain the types and levels of systems, boundaries, elements, and properties of systems, as well as the relationships and methods for system optimization.</li> <li>2. Describe the phases of decision-making system development.</li> <li>3. Outline the elements and properties of agroecosystems in the context of soil quality, fertilization, plant protection, and economic analysis.</li> <li>4. Apply the phases of system development to create decision-making systems for fertilization, plant protection, and economic analysis.</li> <li>5. Identify and collect an initial dataset for decision-making systems in fertilization, plant protection, and the economic analysis of agricultural production.</li> <li>6. Prepare collected data for integration into a computer-based decision-making system.</li> <li>7. Test the production system using a decision-making model and computer programs.</li> <li>8. Evaluate decision-making processes for fertilization, soil amendment measures, and plant protection from technological and economic perspectives.</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 or written.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Lončarić, Z., Lončarić, R. (2010.): Kompjutorski sustavi odlučivanja. Poljoprivredni fakultet u Osijeku. Interna skripta.</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Lončarić, Z. (1999): Matematičko modeliranje rodnosti ozime pšenice. Dissertation. Poljoprivredni fakultet u Osijeku. Osijek.</li> <li>2. Driessen, P.M. (1986): The Q.L.E. primer. A first introduction to quantified land evaluation procedures. Agricultural University, Wageningen, The Netherlands.</li> <li>3. Hanks, J., Ritchie, J.T. (1991): Modelling Plant and Soil Systems. Number 31 in the series Agronomy. ASA, CSSA, SSSA. Madison, Wisconsin, USA.</li> <li>4. Boote, K.J., Loomis, R.S. (1991): Modelling Crop Photosynthesis – from biochemistry to Canopy. CSSA Special Publication Number 19. CSSA, ASA. Madison, Wisconsin, USA.</li> <li>5. Jones, J.W., Mishoe, J.W., Boote, K.J. (1987): Introduction to simulation and modelling. Food&amp;Fertilizer Technology Center. Technical Bulletin 100.</li> </ol>		

6. Rengel, Z. (1993): Mechanistic simulation models of nutrient uptake: A review. *Plant and Soil* 152: 161-173.

<b>MEDICINAL AND SPICE PLANTS</b>		
<b>Coordinator</b>	Tomislav Vinković	
<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 (35L + 30P + 10S)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	To familiarize students with the biology and ecology of medicinal and aromatic plants, as well as with technological solutions for plantation cultivation and production in greenhouses, along with industrial processing of major medicinal, aromatic, and spice herbs.	
<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. Identify and describe medicinal and spice plants and categorize them based on their medicinal properties.</li> <li>2. Recognize medicinal and spice plants in their natural habitats.</li> <li>3. Select and apply a specific production technology model depending on the main characteristics of the species, cultivation medium, and agroecological factors.</li> <li>4. Identify diseases and pests of medicinal and spice plants and implement measures for their control.</li> <li>5. Manage the processes of production, processing, and finalization of products.</li> <li>6. Predict yields and product quantities and select appropriate product markets.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
The right to take the final exam is granted upon accumulating a minimum number of assessment points. Assessment points are earned through class attendance (minimum 70%), participation in class activities, 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 conducted orally.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Parađiković, N. (2014): Ljekovito i začinsko bilje – online interna skripta, Poljoprivredni fakultet u Osijeku.</li> <li>2. Toplak Galle, K. (2009): Domaće ljekovito bilje, Mladinska knjiga Založba, Ljubljana.</li> <li>3. Šilješ, I., Grozdanić, Đ., Grgesina, I. (1992): Poznavanje, uzgoj i prerada ljekovitog bilja, Školska knjiga, Zagreb.</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Kišgeci, J. (2005): Lekovite i aromatične biljke, Partenon, Beograd.</li> <li>2. Znanstveni i stručni radovi iz relevantnih časopisa i baza vezani za proizvodnju, uzgoj i preradu ljekovitog bilja.</li> </ol>		

<b>HUNTING AND CYNOLGY</b>		
<b>Coordinator</b>	Ivica Bošković	
<b>Collaborators</b>	Tihomir Florijančić	
<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)	L-75
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	The aim of this module is to familiarize students with the biology and ecology of wildlife, the basics of game management, and cynology.	
<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. Interpret legal regulations governing the field of hunting.</li> <li>2. Describe the biological and ecological characteristics of animal species classified as wildlife.</li> <li>3. Interpret ecological factors of habitats to assess the economic capacity of hunting grounds and use this information to plan management guidelines for different wildlife species and hunting areas.</li> <li>4. List and describe various types of hunting weapons, handle firearms safely, and explain the ballistics of hunting weapons.</li> <li>5. Enumerate, describe, and evaluate wildlife trophies.</li> <li>6. Identify and describe different dog breeds and their uses.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
In determining the final grade for students, continuous class monitoring (class participation, preparation for lessons, and reflective reviews of content), continuous knowledge assessment (partial exams), and the final written exam are considered. Taking the partial exams is not mandatory, whereas the final exam is mandatory. Class attendance is mandatory in accordance with the Regulations on Studies and Studying at Josip Juraj Strossmayer University of Osijek. If a student is absent for more than 30% of total class hours (more than four sessions), they lose the right to obtain a signature.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Tucak i sur. (2003.): Lovna kinologija, Poljoprivredni fakultet u Osijeku</li> <li>2. Tucak i sur. (2001.): Lovstvo, II. prošireno izdanje</li> <li>3. Janicki i sur. (2007.): Zoologija divljači</li> </ol>		
<b>Additional literature</b>		

<b>MEDITERRANIAN FRUIT-GROWING AND VITICULTURE</b>		
<b>Coordinator</b>	Aleksandar Stanisavljević	
<b>Collaborators</b>	Vladimir Jukić Mato Drenjančević Toni Kujundžić Dejan Bošnjak	
<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 (70L + 5S)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	To familiarize students with the general and economic importance of Mediterranean fruit crops. Through lectures, introduce students to the dominant agroecological conditions prevailing in the coastal region. Explain the differences in biology and physiology between dominant continental and Mediterranean fruit species. Analyse the technological characteristics of commercial cultivation in specific production models.	
<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 and define the general and economic significance of fruit cultivation in the Mediterranean.</li> <li>2. Describe and define the general and economic significance of grapevine cultivation in the Mediterranean.</li> <li>3. Clearly describe the biology and physiology of fruit species and grapevines in the Mediterranean climate.</li> <li>4. Define cultivation models for fruit species and grapevines based on production purposes.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
<p>Students are expected to attend classes regularly and actively participate in tasks during lectures. In the second part of the semester, students are required to prepare an independent seminar paper, which is mandatory. The seminar paper is presented orally, lasting 10 to 15 minutes, using a PowerPoint presentation. The presentation schedule will be arranged in advance. After completing lectures and exercises, students take a final exam, which is conducted orally. It is recommended that students take notes during lectures and prepare for the exam using the mandatory literature. PowerPoint presentations will be used during lectures to aid in explaining the discussed content, and printed handouts of these presentations will be made available to students. The final grade is based on continuous class participation (class activity, lesson preparation, reflective reviews of content) and seminar papers. The evaluation of seminar papers includes clarity, accuracy, and relevance of the information presented, as well as the overall (technical and visual) quality of the presentation. The final oral exam consists of two parts. After passing the oral exam on the viticulture section, the student proceeds to the oral exam on the fruit-growing section. Class attendance is mandatory in accordance with the Regulations on Studies and Studying at Josip Juraj Strossmayer University of Osijek.</p>		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Jemrić, Tomislav (2007): Cijepljenje i rezidba voćaka, Naklada Uliks, Rijeka</li> <li>2. Krpina, Ivo (2004): Voćarstvo, Nakladni zavod Globus, Zagreb (knjiga)</li> <li>3. Looney, N. N., Jackson, D. (1999): Temperate and subtropical fruit production</li> <li>4. Bakarić, P. (1983): Uzgoj mandarine unšiu, Stanica za južne kulture, Dubrovnik</li> <li>5. Tabain, F. (1975): Uzgoj agruma, Zagreb</li> <li>6. Guidelines for integrated production of citrus, IOBC Technical Guidelines</li> <li>7. Guidelines for integrated production of olives, IOBC Technical Guidelines</li> <li>8. Vršič, S., Lešnik, M. (2005): Vinogradništvo, Kmečki glas, Ljubljana</li> <li>9. Maletić, E., Karoglan Kontić, J., Pejić, I. (2008.): Vinova loza – ampelografija, ekologija, oplemenjivanje, Školska knjiga, Zagreb</li> <li>10. Mirošević, N., Turković, Z. (2003.): Ampelografski atlas, Golden marketing i tehnička knjiga, Zagreb</li> <li>11. Mirošević, M. (2007): Razmnožavanje loze i lozno rasadničarstvo, Golden marketing – Tehnička knjiga, Zagreb</li> </ol>		

12. During the course, the latest papers published in reputable international journals will be selected and used as a basis for seminar preparation.

**Additional literature**

1. <https://fruit.cornell.edu/>
2. <https://www.canr.msu.edu/fruit/>
3. <https://www.fao.org/home/en>
4. <https://www.freshplaza.com/europe/>



<b>BASICS OF DIGITAL MAPPING</b>		
<b>Coordinator</b>	Ivan Plaščak	
<b>Collaborators</b>	Dorijan Radočaj	
<b>Study year and semester</b>	2nd year, 3rd semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	Number of class hours (L + P + S)	L – 35, P – 25, S – 15, Pr – 0
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	Acquiring fundamental knowledge in the fields of Digital Cartography and Remote Sensing, as well as developing the ability for future independent research in these areas. Analyzing results obtained through remote sensing. Familiarization with global systems such as LPIS-ARKOD and the Agronet system in agriculture. Approaches to map creation in agriculture and working with digital maps in agriculture (nutrients, yields, and pest control maps).	
<b>Course enrollment requirements</b>	no preconditions	
<b>Intended course learning outcomes</b>		
Upon successfully completing the module, the student will be able to:		
<ol style="list-style-type: none"> <li>1. describe the principles and functioning of GIS, precision agriculture, and interpret their application in agriculture;</li> <li>2. explain the use of databases (expert systems) and outline the methodology for creating thematic maps for cultivation and plant cultivation regionalization;</li> <li>3. describe digital aerial photogrammetry and satellite photogrammetry, analyze, and interpret imagery;</li> <li>4. explain Geoinformation technologies, GIS software, and Remote Sensing;</li> <li>5. define, explain, and present Precision Agriculture, and interpret agricultural maps (nutrients, yields);</li> <li>6. explain the methodology for creating thematic maps in various disciplines; and</li> <li>7. describe and interpret the use of systems like CORINE and LPIS-ARKOD.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
The right to take the Final Examination is earned by accumulating a minimum number of assessment points. Assessment points are obtained based on attendance (minimum 70%), participation in class, and grades from partial examinations. During the semester, students take partial examinations. The Final Examination is mandatory, and a passing grade on the Final Examination is a prerequisite for a positive overall grade. The Final Examination is oral.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Jurišić M., Plaščak I. (2009): <i>Geoinformacijski sustavi: GIS u poljoprivredi i zaštiti okoliša</i>, Poljoprivredni fakultet Osijek.</li> <li>2. Jurišić M., Glavaš J., Plaščak I., Antonić O., Radočaj D. (2021): <i>Geoinformacijske tehnologije: GIS u ekonomiji</i>, Fakultet agrobiotehničkih znanosti Osijek.</li> <li>3. Radočaj D., Jurišić M., Plaščak I. (2021): <i>Geoinformacijske tehnologije: GIS u poljoprivredi i zaštiti okoliša – praktikum</i>, Fakultet agrobiotehničkih znanosti Osijek.</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Burrough P. A., McDonnell R. A. (2006): <i>Principles of Geographical Information Systems – Spatial Information Systems and Geostatistics</i>, Oxford University Press., UK.</li> </ol>		

<b>WILD EDIBLE AND POISONOUS PLANTS</b>		
<b>Coordinator</b>	Marija Ravlić	
<b>Collaborators</b>	Renata Baličević	
<b>Study year and semester</b>	Second year, 3rd semester	
<b>Number of credits and mode of delivery</b>	ECTS	6
	Hours (L + E)	75 (45 L + 30 E)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	Introducing students to the wild flora through its significance and distribution in the Republic of Croatia. Identifying edible and poisonous plants. Determining nutritional values and creating a harvesting calendar.	
<b>Course enrolment requirements</b>	No prerequisites	
<b>Intended course learning outcomes</b>		
Upon successfully completing the module, students will be able to:		
<ol style="list-style-type: none"> <li>1. Analyze the significance and distribution of wild edible plants.</li> <li>2. Group wild edible plants and compare the nutritional value of different plant parts.</li> <li>3. Describe developmental stages and create a harvesting calendar for wild edible plants.</li> <li>4. Define poisonous wild plants and distinguish between edible and poisonous wild plants.</li> <li>5. Classify a systematic overview of edible and poisonous tree species.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
The right to take the final exam is granted by achieving a minimum number of grade points. Grade points are earned through class attendance (minimum 70%), participation in class activities, and grades from partial exams. During the semester, students take three partial exams. 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. Grljić, Lj. (2005.): Enciklopedija samoniklog jestivog bilja. Ex Libris, Rijeka.</li> <li>2. Glavaš, M. (2019.): Enciklopedija domaćeg ljekovitog bilja. Naklada Ceres, Zagreb.</li> <li>3. Grljić, Lj. (1984.): 99 jestivih i otrovnih bobica. Prosvjeta, Zagreb.</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Domac, R. (2002): Flora Hrvatske, Školska knjiga, Zagreb.</li> <li>2. Knežević, M. (2006): Atlas korovne, ruderalne i travnjačke flore. Poljoprivredni fakultet u Osijeku.</li> <li>3. Znanstveni i stručni radovi iz relevantnih časopisa i baza.</li> </ol>		

<b>FRICION AND WEAR OF AGRICULTURAL MACHINERY</b>		
<b>Coordinator</b>	Goran Heffer	
<b>Collaborators</b>	Ivan Vidaković Goran Pačarek	
<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+E+S)	75 (55L+20E)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	To acquaint students with basic terms in the field of tribology and a systematic approach in solving the problem of wear of parts of agricultural machinery.	
<b>Course enrolment requirements</b>	No enrolment requirements	
<b>Intended course learning outcomes</b>		
<p>After successfully completing the course, the student will be able to:</p> <ol style="list-style-type: none"> <li>1. understand the basic terms in the field of tribology,</li> <li>2. to identify problems of a tribological nature in technical systems,</li> <li>3. describe the relationship between friction and material wear,</li> <li>4. define basic wear mechanisms in wear processes,</li> <li>5. identify tribological measures to avoid and reduce wear,</li> <li>6. analyze the forms of wear and tear in wear processes,</li> <li>7. carry out an analysis of a practical wear case (Case study ) parts of agricultural technology and determine wear factors,</li> <li>8. independently choose the application of appropriate tribological measures in the processes of wearing agricultural equipment.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
<p>Students are expected to attend classes regularly and actively participate during lectures. Within the course, students create an independent seminar paper that they present orally for 10 to 15 minutes with a PowerPoint presentation. The presentation schedule will be agreed in advance. Two partial written exams will be held during the semester. At the beginning of the semester, students will be informed of the exact dates of the partial exams. After the lectures, the students write the final exam. The final exam is a written one. Students are recommended to take notes during lectures, and to prepare exams from Obligatory literature.</p>		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Ivušić, V. (1998): Tribologija, Hrvatsko društvo za materijale i tribologiju, Zagreb</li> <li>2. Grilec, K.; Jakovljević, S.; Marić, G. (2015.): Tribologija u strojarstvu. FSB Zagreb</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Czichos, H. (1978): Tribology - a system approach to the science and technology of friction lubrication and wear, Elsevier, Amsterdam-Oxford-New York</li> <li>2. Kragelsky, I.V.; Alisin, V.V. (1981): Friction - Wear - Lubrication, Tribology Handbook, Mir Publishers, Moscow</li> <li>3. Odabrani radovi iz referentnih međunarodnih časopisa - <i>Wear, Tribology International, Journal of Agricultural Engineering Research</i></li> </ol>		

<b>TROPICAL CROPS</b>		
<b>Coordinator</b>	Bojan Stipešević	
<b>Collaborators</b>	Danijel Jug Bojana Brozović	
<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+E+S)	75 (65L + 5E + 5S)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	To acquaint students with the ecological, biological and economic features of the most important tropical cultures.	
<b>Course enrolment requirements</b>	No enrolment requirements	
<b>Intended course learning outcomes</b>		
<p>After successfully completing the course, the student will be able to:</p> <ol style="list-style-type: none"> <li>1. describe the influence of climate on tropical agriculture</li> <li>2. describe tropical vegetation</li> <li>3. describe tropical soils</li> <li>4. describe management systems in the tropics</li> <li>5. describe the use, specifics of chemical composition, ecology, morphology and production of tropical crops for food, starch, sugar, oil, fiber and spices</li> <li>6. discuss the possibilities of cultivation in our region</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
<p>The right to access the final exam is achieved by collecting the minimum number of assessment points. Assessment points are earned on the basis of class attendance (minimum 70%), class activities, seminar work and grades from partial exams. During the semester, students take two partial exams (in the 8th and 15th week of classes). The final exam is mandatory, and a positive grade from 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. Stipešević, B. Tropske kulture-predavanja. 2019.</li> </ol>		
<b>Dopunska literatura</b>		
<ol style="list-style-type: none"> <li>1. Litzenberger, S.C. (2005): Guide for Field Crops in the Tropics and the Subtropics. University Press of the Pacific, str 336.</li> <li>2. Palaniappan, S. (2006): Cropping Systems in the Tropics (Principles and Management). New Age International, str. 224.</li> <li>3. Webster, C.C., Wilson, P.N. (1980): Agriculture in the Tropics, Longman Group, Ltd., str. 640.</li> <li>4. Pursegrove, JW(1985): Tropical crops, Longman Group Ltd, p. 606.</li> </ol>		

<b>MARKET AND MARKETING IN HORTICULTURE</b>		
<b>Coordinator</b>	Ruzica Lončarić	
<b>Collaborators</b>	Sanja Jelić Milković	
<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+E+S)	75 (50L + 25S)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	Introduce students about needs, supply, demand and prices, as well as the marketing mix, while taking into account the specificity of a wide range of horticultural products.	
<b>Course enrolment requirements</b>	<i>No enrolment requirements</i>	
<b>Intended course learning outcomes</b>		
<p>After successfully completing the course, the student will be able to:</p> <ol style="list-style-type: none"> <li>1. Define the place of the market in the scientific system and its characteristics as a scientific discipline</li> <li>2. Describe the term market, the morphology and structure of the market</li> <li>3. List and explain market factors</li> <li>4. Analyze and explain the elements of the marketing mix, as well as the micro and macro environment of the company</li> <li>5. Interpret the micro and macro environment of the company</li> <li>6. Create a Case study of a specific agricultural holding or agricultural business organization</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
<p>The right to access the final exam is achieved by collecting the minimum number of assessment points. Assessment points are earned on the basis of class attendance, class activities, assignments during lectures and seminars, seminar grades, and grades from partial exams. During the semester, students prepare an independent seminar paper, which is mandatory. Furthermore, students take two partial exams during the course. The final exam is mandatory, and a positive grade from the final exam is a prerequisite for a positive final grade. The final exam is written or oral.</p>		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Tolušić, Z. (2007): Tržište i distribucija poljoprivredno-prehrambenih proizvoda. Poljoprivredni fakultet u Osijeku, Osijek.</li> <li>2. Meler, M. (2005): Osnove marketinga, Ekonomski fakultet u Osijeku. Osijek</li> <li>3. Bangs, D. (1994): Plan marketinga za vaše poduzeće, proizvode i usluge, Centar za poduzetništvo, Osijek</li> <li>4. Kotler, Ph (1999): Upravljanje marketingom. Informator. Zagreb.</li> <li>5. Baban, Lj. (1987): Tržište. Školska knjiga. Zagreb</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 Textbooks Munich</li> </ol>		

<b>USAGE AND MAINTENANCE OF TECHNICAL SYSTEMS</b>		
<b>Coordinator</b>	Željko Barač	
<b>Collaborators</b>	Tomislav Jurić	
<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+E+S)	75 (25L + 30E + 20S)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	Acquaint applicants with the basic procedures for using and maintaining technical systems in agriculture.	
<b>Course enrolment requirements</b>	No enrolment requirements	
<b>Intended course learning outcomes</b>		
<p>After successfully completing the course, the student will be able to:</p> <ol style="list-style-type: none"> <li>1. Describe the most important components of technical systems.</li> <li>2. Understand the complexity and interaction between the components of technical systems.</li> <li>3. Understand procedures for assessing the reliability of a technical system.</li> <li>4. Describe use and maintenance as a series that includes various operations and interventions that support the basic function of the technical system.</li> <li>5. To adopt the working principles of the use and maintenance of technical systems that ensure optimal use from the position of ergonomic - economic and technical - technological criteria.</li> <li>6. Create and present a given topic from the field of technical systems.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
<p>The right to access the final exam is achieved by collecting the minimum number of assessment points. Assessment points are earned on the basis of class attendance (minimum 70%), class activities, seminar grades and grades from partial exams. During the semester, students take two partial exams (in the 7th and 15th week of classes). The final exam is mandatory, and a positive grade from 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. Emert, R., Jurić, T., Štefanek, E., Filipović, D. (1995): Održavanje traktora i poljoprivrednih strojeva, Sveučilišni udžbenik, Osijek.</li> <li>2. Emert, R., Bukvić, Ž., Jurić, T., Filipović, D. (1996.): Popravak poljoprivrednih strojeva, Sveučilišni udžbenik, Osijek.</li> <li>3. Sebatijanović, S. (2002): Osnove održavanja strojarских konstrukcija, Sveučilišni udžbenik, Slavonski Brod.</li> <li>4. Najnoviji radovi objavljeni iz područja uporabe i održavanja poljoprivrednih strojeva.</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Adamović, Ž., Jevtić, M. (1988) Preventivno održavanje u mašinstvu. Građevinska knjiga, Beograd</li> <li>2. Baldin, A.; Furlanetio L.: Održavanje po stanju, OMO, Beograd, 1980.</li> </ol>		

<b>PLANT GROWING IN GREENHOUSES OR GLASSHOUSES</b>		
<b>Coordinator</b>	Tomislav Vinković	
<b>Collaborators</b>	Boris Ravnjak Monika Tkalec Kojić	
<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+E+S)	75 (30L + 30E + 15S)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	Acquaint students with the production of plants in protected areas and with the construction of greenhouses when choosing structures, materials and equipment. Selection and modeling of cultivation systems in soil, substrate (of different composition), container cultivation, hydroponic cultivation in substrate and without substrate. Sterilization and disinfection of premises, application of biological methods in the protection of cultures.	
<b>Course enrolment requirements</b>	No enrolment requirements	
<b>Intended course learning outcomes</b>		
After successfully completing the course, the student will be able to:		
<ol style="list-style-type: none"> <li>1. List and describe the types of protected areas.</li> <li>2. Recognize the characteristics of the location and other factors when building protected areas.</li> <li>3. Choose type of protected space depending on the choice of production technologies.</li> <li>4. Manage modern production systems and control units.</li> <li>5. Organize the production process and maintain protected area.s</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
The right to access the final exam is achieved by collecting the minimum number of assessment points. Assessment points are earned on the basis of class attendance (minimum 70%), class activities and grades from partial exams. During the semester, students take two partial exams (in the 7th and 15th week of classes). The final exam is mandatory, and a positive grade from the final exam is a prerequisite for a positive final grade. The final exam is		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Parađiković, N. (2009.): Zaštićeni prostori plastenici - staklenici, Poljoprivredni fakultet Osijek, Osječko-baranjska županija, Osijek</li> <li>2. Castila, N. (2013): Greenhouse technology and management 2nd edition, CAB International, Wallingforth, Oxfordshire, UK</li> <li>3. Goldammer, T. (2019): Greenhouse Management, Apex publishers, Centreville, Virginia, USA</li> <li>4. Welbaum, G.E. (2015): Vegetable production and practices, CAB International, Wallingforth, Oxfordshire, UK</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. 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> <li>2. Znanstveni i stručni radovi iz relevantnih časopisa i baza vezani za proizvodnju u zaštićenim prostorima</li> </ol>		

<b>GAME BREEDING AND PROTECTION</b>		
<b>Coordinator</b>	Ivica Bošković	
<b>Collaborators</b>	Tihomir Florijančić	
<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+E+S)	75 (40L + 20E + 15S)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	To acquaint participants with ways of breeding and protecting game in Croatia, Europe and the world, with an emphasis on the positive and negative significance of environmental factors on game, primarily climate, soil, and other biotic and abiotic factors.	
<b>Course enrolment requirements</b>	No enrolment requirements	
<b>Intended course learning outcomes</b>		
<p>After successfully completing the course, the student will be able to:</p> <ol style="list-style-type: none"> <li>1. Classify the levels of game protection in (un)protected nature areas</li> <li>2. Describe the biological, ecological and zoogeographic characteristics of wild game</li> <li>3. Describe game habitats</li> <li>4. Interpret the ecological factors of the habitat with the aim of assessing the economic capacity of the hunting grounds and, based on this, plan the guidelines for the management of the hunting grounds</li> <li>5. Describe and recognize the most important game diseases</li> <li>6. Comment, argumentatively and critically, on the given topic from breeding or nature protection</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
<p>In forming the final grade for students, continuous monitoring of classes is taken into account (activity in class, preparation for class, reflective review of course contents), seminar work and written exam. The evaluation of the seminar paper includes the clarity, accuracy and relevance of the written seminar information, as well as the overall (technical and visual) quality of the presentation.</p> <p>Attending classes is mandatory in accordance with the Ordinance on studies and studying at JJ Strossmayer University in Osijek. The final exam is mandatory, and a positive grade from the final exam is a prerequisite for a positive final grade. The final exam is written.</p>		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Tucak, Z. i sur. (2002): Lovstvo, drugo prošireno izdanje. Poljoprivredni fakultet u Osijeku</li> <li>2. Tucak, Z. i sur. (2006): Zaštita divljači. Poljoprivredni fakultet u Osijeku.</li> <li>3. Janicki, Z. i sur. (2007): Zoologija divljači. Veterinarski fakultet Sveučilišta u Zagrebu.</li> <li>4. Anonimus : Zbirka zakonskih i podzakonskih propisa iz lovstva. Ministarstvo poljoprivrede <a href="http://www.mps.hr/.../LOVSTVO/Zbirka%20propisa%20iz%20lovstva.pdf">http://www.mps.hr/.../LOVSTVO/Zbirka%20propisa%20iz%20lovstva.pdf</a></li> <li>5. Anonimus (2013): Zakon o zaštiti prirode. Narodne novine broj 80.</li> <li>6. Topić, J., Vukelić, J. (2009): Priručnik za određivanje kopnenih staništa u Hrvatskoj. Državni zavod za zaštitu prirode, Zagreb.</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Mustapić, Z. (gl.ur.) (2004): Lovstvo. Hrvatski lovački savez, Zagreb.</li> <li>2. Darabuš, S. i sur. (2009): Osnove lovstva. Hrvatski lovački savez, Zagreb.</li> <li>3. Frković, A. (2006): Priručnik za ocjenjivanje lovačkih trofeja. Hrvatski lovački savez, Zagreb.</li> </ol>		



<b>INDOOR PLANT GROWING</b>		
<b>Coordinator</b>	Aleksandar Stanisavljević	
<b>Collaborators</b>	Dejan Bošniak	
<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+E+S)	75 (65L + 10E)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	To acquaint students with the technologically specific characteristics of the cultivation and production of fruit species and vines in agrobiotopes of protected areas.	
<b>Course enrolment requirements</b>	No enrolment requirements	
<b>Intended course learning outcomes</b>		
<p>After successfully completing the course, the student will be able to:</p> <ol style="list-style-type: none"> <li>1. Describe and define the agro-ecological factors of the cultivation and production of fruit species and vines in protected areas.</li> <li>2. Know the principles of technical support procedures.</li> <li>3. Interpret analyzes and nutritional needs - control of soil fertility, substrate, inert media and nutrient solutions.</li> <li>4. Describe procedures and means for stimulating growth and fertility, controlling pests and diseases in a protected area.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
<p>Students are expected to continuously attend classes and actively participate in assignments during lectures. In the second part of the course, field lessons and exercises will be organized in the orchard. Going to field classes is mandatory. In the second part of the course, students prepare an independent seminar paper, which is mandatory. Students present the seminar work orally for 10 to 15 minutes with a PowerPoint presentation. The presentation schedule will be agreed in advance. Students are recommended to take notes during lectures, and to prepare exams from obligatory literature. During the lectures, PowerPoint presentations will be used to help explain the content discussed in the lectures. The presentations will be available to students in printed form (handouts). Continuous monitoring of classes (class activity, preparation for class, reflective review of class content), seminar work is taken into account in forming the final grade for students. The evaluation of the seminar paper includes the clarity, accuracy and relevance of the written seminar information, as well as the overall (technical and visual) quality of the presentation. The final exam is oral. Attending classes is mandatory in accordance with the Ordinance on studies and studying at J.J. Strossmayer University in Osijek.</p>		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Kurtović Omer (2008): Proizvodnja u plastenicima (dopinjeno izdanje), Penn, 2008</li> <li>2. Parađiković, N. (2009.): Zaštićeni prostori plastenici - staklenici, sveučilišni priručnik, Poljoprivredni fakultet Osijek</li> <li>3. Jelaska, S. (1994.): Kultura biljnih stanica i tkiva. Školska knjiga. Zagreb</li> <li>4. Mali gospodarski savjetnik: Proizvodnja u staklenicima I plastenicima, Gospodarski list 01.11.2012.</li> <li>5. During the course, the latest works published in reference international journals will be determined, which will be used for the preparation of the seminar</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. <a href="https://www.fao.org/home/en">https://www.fao.org/home/en</a></li> <li>2. <a href="https://www.freshplaza.com/europe/">https://www.freshplaza.com/europe/</a></li> <li>3. <a href="https://fruit.cornell.edu/">https://fruit.cornell.edu/</a></li> <li>4. <a href="https://www.canr.msu.edu/fruit/">https://www.canr.msu.edu/fruit/</a><a href="https://www.greenhousegrowing.co.uk/">https://www.greenhousegrowing.co.uk/</a></li> <li>5. <a href="https://cals.arizona.edu/">https://cals.arizona.edu/</a></li> <li>6. <a href="https://www.hydroponics.eu/">https://www.hydroponics.eu/</a></li> <li>7. <a href="https://www.terraaquatica.com">https://www.terraaquatica.com</a></li> </ol>		

<b>FRUIT GROWING, VITICULTURE AND WINE PRODUCTION</b>		
<b>Coordinator</b>	Vladimir Jukić	
<b>Collaborators</b>	Aleksandar Stanisavljević Mato Drenjančević Toni Kujundžić Dejan Bošniak	
<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+E+S)	75 (65 L + 10 E)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	Acquaint applicants with the methodological units of biology and technology of growing fruit trees and vines and processing grapes into wine.	
<b>Course enrolment requirements</b>	No enrolment requirements	
<b>Intended course learning outcomes</b>		
<p>After successfully completing the course, the student will be able to:</p> <ol style="list-style-type: none"> <li>1. Consider the systematic affiliation of fruit trees and vines, ecology, morphology, phenophases of development, fertility and reproduction of fruit trees and vines.</li> <li>2. To compare different systems of supplying soil and plants with macro and microelements in fruit growing and viticulture, methods of improving the physical, chemical and biological properties of the soil and soil maintenance systems in orchards and vineyards.</li> <li>3. Propose different cultivation systems, pruning measures and the choice of framework in fruit growing and viticulture.</li> <li>4. Choose the option of protection against diseases and pests in fruit growing and viticulture.</li> <li>5. Present pomology and ampelography, as well as harvesting and storage.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
<p>In forming the final grade for students, continuous monitoring of classes (class activity, preparation for the lesson, reflective review of class content), continuous monitoring and checking of knowledge (partial exam) and final oral exam are taken into account. Attending classes is mandatory in accordance with the Ordinance on studies and studying at J.J. Strossmayer University in Osijek.</p>		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Miljković, Ivo (1991): Suvremeno voćarstvo, Znanje, Zagreb</li> <li>2. Mirošević, N. Karoglan Kontić, J. (2008.): Vinogradarstvo, Nakladni zavod Globus, Zagreb</li> <li>3. Licul, R., Premužić, D. (1979.): Praktično vinogradarstvo i podrumarstvo, Nakladni zavod znanje, Zagreb</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Mišić, P. D. (1994): Jabuka, Nolit, Beograd</li> <li>2. Bulatović, S. (1989): Savremeno voćarstvo, Nolit, Beograd</li> <li>3. Fregoni, M. (1986.): Viticultura generale, Universita Cattolica - Piacenza,, REDA, Roma</li> <li>4. Burić, D. (1981.): Vinogradarstvo I, Ćirpanov, Novi Sad</li> <li>5. Vršič, S., Lešnik, M. (2005.): Vinogradništvo, Maribor</li> <li>6. Jackson, R.S. (2000.): Wine science. Academic Press, London Jackson, R.S. (2000.): Wine science. Academic Press, London</li> </ol>		

<b>PLANT PROTECTION II</b>		
<b>Coordinator</b>	Ivana Majić	
<b>Collaborators</b>	Ankica Sarajlić Jelena Ilić	
<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+E+S)	75 (45L+30S)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	Introducing students to the principles of plant protection.	
<b>Course enrolment requirements</b>	No enrolment requirements	
<b>Intended course learning outcomes</b>		
After successfully completing the course, the student will be able to:		
<ol style="list-style-type: none"> <li>1. Recognize and describe the morphological features of harmful insect species of agricultural and vegetable crops, fruit trees and vines</li> <li>2. Explain the biology and epidemiology of the most important disease agents of arable and vegetable crops, fruit trees and vines</li> <li>3. Recognize and describe economically significant weeds</li> <li>4. Define and compare different plant protection systems</li> <li>5. Make a decision on the need to apply pesticides</li> <li>6. Argue the advantages and disadvantages of using plant protection products</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
According to the Ordinance on studies and studying at J.J. Strossmayer University in Osijek, students are required to attend classes for a minimum of 70%. Students will be divided into groups, and each group must write a seminar paper and present it publicly. The seminar work is mandatory for the final grade from the Plant Protection II course. Activity in class, written and presented seminar paper, partial written exam and final exam are the conditions for forming the final grade. In forming the final grade for students, continuous monitoring of classes (activity in class, preparation for class, reflective review of course content), seminar work, and partial written and final exam are taken into account.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Ivezić, M. (2008): Entomologija - kukci i ostali štetnici u ratarstvu. Poljoprivredni fakultet u Osijeku Sveučilišta Josipa Jurja Strossmayera u Osijeku, Grafika d.o.o, str. 202.</li> <li>2. Ivezić, M (2003): Štetnici vinove loze i voćaka. Veleučilište u Požegi i Rijeci</li> <li>3. Agrios, G.N. (2005.): Plant Pathology. General Aspects. 5th edition. Elsevier, Amsterdam</li> <li>4. Kišpatic, J. (1992.): Opća fitopatologija. Agronomski fakultet Zagreb</li> <li>5. Baličević R., Ravlić M. (2013): Fitofarmacija, interna skripta za studente Poljoprivrednog fakulteta u Osijeku.</li> <li>6. Glasilo Biljne Zaštite: Pregled sredstava za zaštitu bilja u Hrvatskoj. Izd. HDBZ, Zagreb.</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Ciglar, I. (1998): Integrirana zaštita voćnjaka i vinograda. Zrinski Čakovec</li> <li>2. Maceljski i sur. (2004.): Štetočinje povrća. Zrinski Čakovec</li> <li>3. Jurković, D., Čosić, J. (2003.): Zaštita vinograda i voćnjaka od uzročnika bolesti. Veleučilište u Požegi. Skripta, 1-83.</li> <li>4. Čosić, J., Jurković, D., Vrandečić, K. (2006.): Praktikum iz fitopatologije. <a href="http://www.pfos.hr">http://www.pfos.hr</a></li> <li>5. Maceljski i sur.(1997): Priručnik iz zaštite bilja, Izd. Zavod za zaštitu bilja u poljoprivredi i šumarstvu R. Hrvatske, Zagreb.</li> <li>6. Knežević, M. (2006): Atlas korovne, ruderalne i travnjačke flore. Sveučilište u Osijeku, Poljoprivredni fakultet, Osijek</li> </ol>		

<b>SOIL AND WATER PROTECTION</b>		
<b>Coordinator</b>	Monika Marković	
<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+E+S)	75 (45L + 30E)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	To acquaint students with potential sources of soil and water pollution, especially in agriculture, the role of humans in the prevention and preservation of pollution and the protection of soil and water in agriculture.	
<b>Course enrolment requirements</b>	No enrolment requirements	
<b>Intended course learning outcomes</b>		
<p>After successfully completing the course, the student will be able to:</p> <ol style="list-style-type: none"> <li>1. Identify potential sources of soil and water pollution</li> <li>2. Recognize negative and unprofessional actions that led to soil and water pollution</li> <li>3. Connect possible actions in agriculture with the consequences of soil and water damage</li> <li>4. Propose remediation measures for damaged soil and water</li> <li>5. Propose alternative ways of soil conservation in relation to conventional agriculture</li> <li>6. To understand the importance and role of humans in the pollution and conservation of water and soil in nature, especially in agriculture</li> <li>7. See the connection between soil, water and air pollution and the role of humans in pollution and conservation of water and soil in agriculture</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
<p>The right to access the final exam is achieved by collecting the minimum number of assessment points. Assessment points are earned on the basis of class attendance (minimum 70%), class activities and grades from partial exams. During the semester, students take two partial exams (in the 7th and 15th week of classes). The final exam is mandatory, and a positive grade from the final exam is a prerequisite for a positive overall grade.</p>		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Bašić F. (1999): Zaštita tla i voda (pisana predavanja) Agronomski fakultet</li> <li>2. Kisić I. (2012): Sanacija onečišćenog tla. Agronomski fakultet Sveučilišta u Zagrebu.</li> <li>3. Šoštarić Jasna, Marković Monika (2011): Zaštita tla i voda. Poljoprivredni fakultet Osijek</li> <li>4. Tedeschi, S: (1997): Zaštita voda. Hrvatsko društvo građevinskih inženjera Zagreb i Sveučilište u Zagrebu</li> <li>5. Kisić I. (2014): Uvod u ekološku poljoprivredu. Agronomski fakultet Sveučilišta u Zagrebu.</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Mayer D. ( 1993): Kvaliteta i zaštita podzemnih voda. Hrvatsko društvo za zaštitu voda</li> <li>2. Muhamedagić Fatima, Mehmed C, Veladžić M.: (2020) Ekologija i održivo upravljanje okolišem. Univerzitetski udžbenik, Bihać, 2020. Bosna i Hercegovina</li> </ol>		

<b>ANIMAL HEALTH PROTECTION</b>		
<b>Coordinator</b>	Boris Antunović	
<b>Collaborators</b>	Mislav Đidara	
<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+E+S)	75 (75L)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	Familiarized students with the diseases of domestic animals with an emphasis on the most significant diseases.	
<b>Course enrolment requirements</b>	No enrolment requirements	
<b>Intended course learning outcomes</b>		
<p>After successfully completing the course, the student will be able to:</p> <ol style="list-style-type: none"> <li>1. Differentiate diseases according to etiology.</li> <li>2. Identify external and internal causes of disease.</li> <li>3. Distinguish diseases according to their economic importance or zoonotic potential.</li> <li>4. To associate pathoanatomical changes in animals with disease diagnosis.</li> <li>5. Analyze a particular disease with regard to its ethology, pathogenesis, diagnosis, treatment methods and prophylaxis.</li> <li>6. Apply disease eradication methods that are controlled by law.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
<p>To acquire 6 ECTS credits, the student has the following obligations:</p> <ul style="list-style-type: none"> <li>• attend at least 70% of classes (lectures and field classes);</li> <li>• be active in class, i.e. monitor classes, participate in discussions, and solve assigned tasks;</li> <li>• pass the final oral exam.</li> </ul> <p>The final exam is mandatory, and a positive grade from the final exam is a prerequisite for a positive overall grade.</p>		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Rupić, V. (2009): Zaštita zdravlja domaćih životinja, zarazne i parazitske bolesti, HMU, Zagreb.</li> <li>2. Rupić, V. (2010): Zaštita zdravlja domaćih životinja, Unutrašnje i kirurške bolesti, HMU, Zagreb.</li> <li>3. Rupić, V. (2010): Zaštita zdravlja domaćih životinja, fiziologija i patologija reprodukcije, osobno izdanje autora.</li> <li>4. Rupić, V. (1994): Dijagnosticiranje zaraznih bolesti životinja i upala vimena, Agronomski fakultet.</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Veterinarski priručnik (2012) (VI. izmijenjeno izdanje), Vlasta Herak-Perković, Ž. Grabarević, J. Kos (urednici): Medicinska naklada, Zagreb.</li> <li>2. Cvetnić, Ž.: Bakterijske i gljivične zoonoze. Medicinska naklada. Zagreb.</li> <li>3. Pugh, D.G., Baird, A.N. (2012): Sheep and goat medicine. Second edition., Elsevier</li> <li>4. Divers, J.D., Peek S.F. (2008): Diseases of dairy cattle. Saunders Elsevier</li> </ol>		

<b>BASICS OF PALYNOLOGY</b>		
<b>Coordinator</b>	Edita Štefanić	
<b>Collaborators</b>	Sanda Rašić	
<b>Study year and semester</b>	2nd year, 3rd semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	Number of class hours (L + P + S)	75 (45L+ 10S +20P)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	To familiarize students with the structure and role of pollen and spores, as well as the application of this scientific discipline in agronomy and plant protection.	
<b>Course enrollment requirements</b>	no preconditions	
<b>Intended course learning outcomes</b>		
Upon successfully completing the module, the student will be able to:		
<ol style="list-style-type: none"> <li>1. collect and prepare samples of biological aerosols and honey;</li> <li>2. identify the most significant pollen grains and spores in the air and in honey;</li> <li>3. analyze and interpret data from pollen analyses of air and honey;</li> <li>4. explain the transport of biological aerosols through the air; and</li> <li>5. create a pollen calendar and perform botanical analysis of honey.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
The right to take the Final Examination is earned by accumulating a minimum number of assessment points. Assessment points are obtained based on attendance (minimum 70%), participation in class, and grades from partial examinations. During the semester, students take partial examinations. The Final Examination is mandatory, and a passing grade on the Final Examination is a prerequisite for a positive overall grade. The Final Examination is oral.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Stanley, R.G., Linskens, H.F. (1974): <i>Pollen: Biology, Biochemistry, Management</i>. Springer Verlag, Berlin, Heidelberg, New York</li> <li>2. Grant Smith, E. (1990): <i>Sampling and Identifying Allergenic Pollens and Molds</i>. Blewstone Press. San Antonio, Texas.</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Bučar, M. (2008): <i>Medonosne biljke kontinentalne Hrvatske</i>. Biblioteka Naš okoliš.</li> </ol>		

<b>AGRICULTURAL PHYTOCENOLOGY</b>		
<b>Coordinator</b>	Edita Štefanić	
<b>Collaborators</b>	Sanda Rašić	
<b>Study year and semester</b>	2nd year, 3rd semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	Number of class hours (L + P + S)	75 (45L + 20P + 10 FP)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	introduce students to plant communities (phytocenoses) in anthropogenic ecosystems.	
<b>Course enrollment requirements</b>	no preconditions	
<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. understand and interpret the basic properties of phytocenoses;</li> <li>2. independently conduct mapping of flora and vegetation;</li> <li>3. identify and analyze plant communities of root crops;</li> <li>4. identify and analyze plant communities of cereal crops; and</li> <li>5. identify and analyze plant communities of ruderal habitats.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
The right to take the Final Examination is earned by accumulating a minimum number of assessment points. Assessment points are obtained based on attendance (minimum 70%), participation in class, and grades from partial examinations. During the semester, students take partial examinations. The Final Examination is mandatory, and a passing grade on the Final Examination is a prerequisite for a positive overall grade. The Final Examination is oral.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Barbour, M. G., Burk, J. H., Pitts, W. D. (1987): <i>Terrestrial Plant Ecology</i>. The Benjamin/Cummings Publishing Company, Inc.</li> <li>2. Kent, M., Coker, P. (1985): <i>Vegetation Description and Analysis: A Practical Approach</i>. CRC Press, Boca Raton / Ann Arbor.</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Skender, A. (1990): <i>Fitocenologija u spontanim i antropogenim ekosistemima</i>. Poljoprivredni fakultet Osijek.</li> </ol>		

<b>BUSINESS COMMUNICATIONS AND EXTENSION WORK</b>		
<b>Coordinator</b>	Snježana Tolić	
<b>Collaborators</b>	Olgica Klepač	
<b>Study year and semester</b>	2nd year, 3rd semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	Number of class hours (L + P + S)	L – 50, S – 25
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	Educate students on the fundamentals of business communication and advisory work for teamwork in networked organizational systems	
<b>Course enrollment requirements</b>	no preconditions	
<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 concept and organizational structure of communication;</li> <li>2. list models and forms of communication and identify barriers in communication;</li> <li>3. describe communication strategies;</li> <li>4. analyze the effectiveness of communication;</li> <li>5. interpret leadership, leadership styles, and types of power;</li> <li>6. describe the history of the development of advisory work; and</li> <li>7. describe models of organizing advisory services in agriculture.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
<p>The right to take the Final Examination is granted by achieving the minimum required number of grading points. Grading points are earned based on class attendance (minimum 70%), participation in class activities, and grades from partial examinations. During the semester, students take two partial examinations (in the 7th and 15th weeks of classes). The Final Examination is mandatory, and a passing grade on the Final Examination is a prerequisite for a passing final grade. The Final Examination is oral.</p>		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Michael J. Rouse, Sandra Rouse (2005): <i>Poslovne komunikacije</i>, Masmedia, Zagreb</li> <li>2. Courtland L. Bovee, John V. Thill (2012): <i>Suvremena poslovna komunikacija</i>. 10th ed., Mate d. o. o. Zagreb</li> <li>3. Gwyn E. Jones Chris Garforth (1997): Jones, Gwyn E., and Chris Garforth. 1997. "The History, Development, and Future of Agricultural Extension." Chapter 1 in <i>Improving Agricultural Extension: A Reference Manual</i>, Burton E. Swanson, Robert P. Bentz, and Andrew J. Sofranko, eds. Rome: Food and Agriculture Organization of the United Nations / National Academies of Sciences, Engineering, and Medicine. 2012.</li> <li>4. <i>Adapting Agricultural Extension to Peacebuilding: Report of a Workshop by the National Academy of Engineering and United States Institute of Peace: Roundtable on Technology, Science, and Peacebuilding</i>. Washington, DC: The National Academies Press, <a href="https://doi.org/10.17226/13428">https://doi.org/10.17226/13428</a>.</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Kamilo Antolović, Nikša Sviličić: <i>Komunikacijske vještine: verbalne i neverbalne persuazivne tehnike</i>. K &amp; K Promocija, Zagreb, 2020, 232 pp. ISBN 978-953-56121-5-5</li> </ol>		



<b>BUSINESS FOREIGN LANGUAGE - ENGLISH</b>		
<b>Coordinator</b>	Tihomir Živić	
<b>Collaborators</b>	–	
<b>Study year and semester</b>	2nd year, 3rd semester	
<b>Bodovna vrijednost i način izvođenja nastave</b>	ECTS credits	6
	Number of class hours (L + P + S)	75 (30 L + 45 AP)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	development of listening, speaking, reading, and writing skills, as well as the correct use of (grammatical and vocabulary) structures in (American) English within the field of agrobiotechnical sciences	
<b>Course enrollment requirements</b>	knowledge of English at a minimum B2 level according to the CEFR (students are divided into groups based on CEFR levels after an initial language proficiency test)	
<b>Intended course learning outcomes</b>		
After successfully completing the module, students will be able to:		
<ol style="list-style-type: none"> <li>1. recognize and independently explain key Anglo-American terms relevant to their respective fields in authentic (didacticized) Anglo-American scientific and professional texts;</li> <li>2. utilize prescribed specialized literature and multimedia sources at all levels (business promotional texts, product labels, instructions for use, and scientific articles);</li> <li>3. understand and translate professional material in (American) English;</li> <li>4. communicate accurately in (American) English within the agrobiotechnical field; and</li> <li>5. present agrobiotechnical topics accurately in (American) English.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
The right to take the Final Examination is granted by achieving the minimum required number of grading points. Grading points are earned based on class attendance (minimum 70%), participation in class activities, and grades from partial examinations. During the semester, students take two partial examinations (in the 7th and 15th weeks of classes). The Final Examination is mandatory, and a passing grade on the Final Examination is a prerequisite for a passing final grade. The Final Examination is oral.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Bratulić, Mirna. <i>Found in Translation: Handbook with Exercises</i>. Hrvatska sveučilišna naklada, 2010.</li> <li>2. Gačić, Milica. <i>Gramatika engleskoga jezika struke</i>. Školska knjiga, 2009.</li> <li>3. Murphy, Raymond, et al. <i>Basic Grammar in Use Student's Book with Answers and Interactive eBook: Self-study Reference and Practice for Students of American English</i>. 4th ed., Cambridge UP, 2017.</li> <li>4. Perković, Anica. <i>English in Agriculture</i>. Poljoprivredni fakultet Osijek, 2011.</li> <li>5. Vujčić, Jasna, i Anica Perković. <i>English for Horticulturists</i>. Veleučilište u Slavonskome Brodu / Poljoprivredni fakultet Osijek, 2011.</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Filipović, Rudolf. <i>Veliki englesko-hrvatski rječnik</i>. Školska knjiga, 2017.</li> <li>2. Hlavac, Jim, et al. <i>Translating from Croatian into English: A Handbook with Annotated Translations</i>. Hrvatska sveučilišna naklada, 2019.</li> <li>3. Matas, Đurđa. <i>Četverojezični rječnik iz poljoprivrede, šumarstva, veterine i primijenjene biologije: hrvatsko-njemačko-englesko-latinski</i>. Profil, 1999.</li> <li>4. Murphy, Raymond. <i>English Grammar in Use</i>. 5th ed., e-book, Cambridge UP, 2019.</li> <li>5. Ritz, Josip. <i>Hrvatsko-engleski i englesko-hrvatski agronomski rječnik</i>. Školska knjiga, 1996.</li> </ol>		

<b>Business foreign language - German</b>		
<b>Coordinator</b>	Tihomir Živić	
<b>Collaborators</b>	–	
<b>Study year and semester</b>	2nd year, 3rd semester	
<b>Bodovna vrijednost i način izvođenja nastave</b>	ECTS credits	6
	Number of class hours (L + P + S)	75 (30 L + 45 AP)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	Development of listening, speaking, reading, and writing skills, as well as the correct use of (grammatical and vocabulary) structures in the German language within the agrobiotechnical field.	
<b>Course enrollment requirements</b>		
<b>Intended course learning outcomes</b>		
After successfully completing the module, students will be able to:		
<ol style="list-style-type: none"> <li>1. recognize and independently explain key German terms relevant to their respective fields in authentic (didacticized) German scientific and professional texts;</li> <li>2. utilize prescribed specialized literature and multimedia sources at all levels (business promotional texts, product labels, instructions for use, and scientific articles);</li> <li>3. understand and translate professional material in German;</li> <li>4. communicate accurately in German within the agrobiotechnical field; and</li> <li>5. present agrobiotechnical topics accurately in German.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
The right to take the Final Examination is granted by achieving the minimum required number of grading points. Grading points are earned based on class attendance (minimum 70%), participation in class activities, and grades from partial examinations. During the semester, students take two partial examinations (in the 7th and 15th weeks of classes). The Final Examination is mandatory, and a passing grade on the Final Examination is a prerequisite for a passing final grade. The Final Examination is oral.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Ertl, Josef, et al. <i>Tausend Fragen für den jungen Landwirt</i>. 16th ed., Verlag Eugen Ulmer, 1996.</li> <li>2. Glovacki-Bernardi, Zrinka. <i>Gramatika njemačkog jezika—osnove</i>. Školska knjiga, 2017.</li> <li>3. Haensch, Günther, and Gisela Haberkamp de Anton. <i>Wörterbuch der Landwirtschaft</i>. Verlag Eugen Ulmer, 1996.</li> <li>4. Kljaić, Jasenka. <i>Hrvatsko-njemački praktični rječnik</i>. Školska knjiga, 2017.</li> <li>5. ———. <i>Njemačko-hrvatski praktični rječnik</i>. Školska knjiga, 1998.</li> <li>6. Leitner, Hans. <i>Njemačko-hrvatski rječnik glagola u kontekstu</i>. Školska knjiga, 1998.</li> <li>7. Marčetić, Tamara. <i>Njemački za odrasle</i>. Školska knjiga, 1997.</li> <li>8. Matas, Đurđa. <i>Četverojezični rječnik hrvatsko-njemačko-englesko-latinski: oko 60.000 leksičkih jedinica iz poljoprivrede, šumarstva, veterine, primijenjene biologije</i>. Profil International, 1999.</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Bašić, Zlatko. <i>Veliki hrvatsko-njemački rječnik gospodarskog, pravnog, političkog i svakodnevnog stručnog nazivlja</i>. Bašić, 2000.</li> <li>2. Marčetić, Tamara. <i>Njemački u komunikaciji</i>. Školska knjiga, 2005.</li> <li>3. Matas, Đurđa. <i>Zoološki rječnik hrvatsko-njemačko-englesko-latinski</i>. Školska knjiga, 2009.</li> </ol>		

<b>APPLICATION OF BIO-PREPARATIONS IN VEGETABLES AND FLOWERS PRODUCTION</b>		
<b>Coordinator</b>	Suzana Kristek	
<b>Collaborators</b>	Jurica Jović	
<b>Study year and semester</b>	2nd year, 3rd semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	Number of class hours (L + P + S)	75 (55P + 20V)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	Introducing graduate students to the applications of biopreparations in vegetable and flower production, where they are used as alternatives to mineral fertilizers and chemical pesticides. Familiarizing students with the interactions between microorganisms, including which microorganisms are compatible and can be combined in biopreparations and which are antagonistic to each other	
<b>Course enrollment requirements</b>	no preconditions	
<b>Intended course learning outcomes</b>		
After successfully completing the module, the students will be able to: <ol style="list-style-type: none"> <li>1. Use biopreparations as substitutes for mineral fertilizers. They will understand their effects in facilitating gaseous nitrogen fixation, dissolving rock phosphates, and releasing other macro- and micronutrients, making them available to plants in accessible forms.</li> <li>2. Select appropriate methods for applying beneficial bacteria and fungi to control plant diseases and pests. They will also know how to apply biofungicides and bioinsecticides preventively, through soil treatment.</li> <li>3. Determine the timing of biopreparation applications depending on their purpose. Reduce the use of mineral fertilizers to levels that, in conjunction with the effects of biopreparations, maintain high yields while minimizing environmental pollution.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
The right to take the Final Examination is earned by accumulating a minimum number of assessment points. Assessment points are obtained based on attendance (minimum 70%), participation in class, and grades from partial examinations. During the semester, students take partial examinations. The Final Examination is mandatory, and a passing grade on the Final Examination is a prerequisite for a positive overall grade. The Final Examination is oral.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Kristek, S. (2007.): <i>Agroekologija</i>, Poljoprivredni fakultet u Osijeku (manual).</li> <li>2. Vinković, T., Popović, B., Lončarić, Z., Kristek, S., Ivezic, V., Tkalec Kojić, M., Jović, J., Ravnjak, B. (2019): <i>Okolišno prihvatljiva proizvodnja povrća</i>. Osijek: Fakultet agrobiotehničkih znanosti (manual).</li> <li>3. Lončarić, Z., Kristek, S., Popović, B., Ivezic, V., Jović, J. (2019.): <i>Plodnost tala i gospodarenje organskim gnojivima</i>. Osijek: Fakultet agrobiotehničkih znanosti (manual).</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Ram, P., Shi-Hong Z. (2022.): <i>Beneficial Microorganisms in Agriculture</i>. Springer Nature Switzerland.</li> </ol>		

<b>GIS APPLICATION IN HORTICULTURE</b>		
<b>Coordinator</b>	Mladen Jurišić	
<b>Collaborators</b>	Ivan Plaščak Dorijan Radočaj	
<b>Study year and semester</b>	2nd year, 3rd semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	Number of class hours (L + P + S)	L – 50, P – 20, S – 5, Pr – 0
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	Familiarize students with the application of GIS technologies and precision agriculture, particularly in the cultivation of horticultural crops. Through seminar work, train candidates to independently interpret satellite and aerial imagery and utilize digital overlays. Using existing GIS applications in horticulture and project studies, train participants to contribute effectively to such projects.	
<b>Course enrollment requirements</b>	no preconditions	
<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 principles and functionality of GIS technology, including digital aerial and satellite photogrammetry, thematic maps, and (D)GPS;</li> <li>2. identify and explain the application of remote sensing in agriculture, providing examples from practice;</li> <li>3. explain precision agriculture and list potential areas of application in agriculture, particularly horticulture;</li> <li>4. interpret and demonstrate the practical use of databases (expert systems) and describe the creation of thematic maps in horticulture;</li> <li>5. describe the regionalization of horticultural crops in a GIS environment, including thematic maps and cadasters;</li> <li>6. outline agrotechnical operations in precision agriculture systems (navigation, fertilization, and pest control) in horticulture; and</li> <li>7. describe the methodology for creating and explain an example of developing maps of greenery, urban layouts, and other horticultural components.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
The right to take the Final Examination is earned by accumulating a minimum number of assessment points. Assessment points are obtained based on attendance (minimum 70%), participation in class, and grades from partial examinations. During the semester, students take partial examinations. The Final Examination is mandatory, and a passing grade on the Final Examination is a prerequisite for a positive overall grade. The Final Examination is oral.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Jurišić M., Plaščak I. (2009): <i>Geoinformacijski sustavi: GIS u poljoprivredi i zaštiti okoliša</i>, Poljoprivredni fakultet Osijek.</li> <li>2. Jurišić M., Glavaš J., Plaščak I., Antonić O., Radočaj D. (2021): <i>Geoinformacijske tehnologije: GIS u ekonomiji</i>, Fakultet agrobiotehničkih znanosti Osijek.</li> <li>3. Radočaj D., Jurišić M., Plaščak I. (2021): <i>Geoinformacijske tehnologije: GIS u poljoprivredi i zaštiti okoliša – praktikum</i>, Fakultet agrobiotehničkih znanosti Osijek.</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Burrough P. A., McDonnell R. A. (2006): <i>Principles of Geographical Information Systems – Spatial Information Systems and Geostatistics</i>, Oxford University Press., UK.</li> </ol>		

<b>APPLICATION OF PESTICIDES IN AGRICULTURE</b>		
<b>Coordinator</b>	Marija Ravlić	
<b>Collaborators</b>	Renata Baličević	
<b>Study year and semester</b>	2nd year, 3rd semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	Number of class hours (L + P + S)	75 (40 L + 20 P + 15 S)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	familiarization with the properties of pesticides, selection of formulations, handling of plant protection products, determination of dosage and concentration, applicator protection, application of preparations, and occurrence of phytotoxicity	
<b>Course enrollment requirements</b>	no preconditions	
<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. name different groups of pesticides, including plant protection products;</li> <li>2. compare the physicochemical properties and toxicology of plant protection products;</li> <li>3. distinguish limitations in the use of pesticides;</li> <li>4. classify formulations of plant protection products; and</li> <li>5. apply safety measures when working with pesticides and prevent environmental contamination.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
The right to take the Final Examination is earned by accumulating the minimum required number of assessment points. Assessment points are gained through class attendance (minimum 70%), participation in class activities, and grades from partial examinations. During the semester, students are required to prepare an independent seminar paper, which is mandatory. Students present their seminar paper orally, with a duration of 10 to 15 minutes. Throughout the semester, students take three partial examinations. The Final Examination is mandatory, and a passing grade in the Final Examination is a prerequisite for a positive final grade. The Final Examination is conducted orally.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Baličević R., Ravlić M. (2014.): <i>Herbicidi u zaštiti bilja</i>. Sveučilište J. J. Strossmayera, Poljoprivredni fakultet u Osijeku.</li> <li>2. Ravlić, M. (2017.): <i>Zbirka zadataka iz fitofarmacije</i>. Sveučilište J. J. Strossmayera, Poljoprivredni fakultet u Osijeku.</li> <li>3. F. Bagi, K., Bodnar (2012.): <i>Fitomedicina</i>. Univerzitet u Novom Sadu, Poljoprivredni fakultet.</li> <li>4. R. Šovljanski, S. Lazić (2007.): <i>Osnovi fitofarmacije</i>. Univerzitet u Novom Sadu, Poljoprivredni fakultet.</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Scientific and professional papers from relevant databases and journals.</li> </ol>		

<b>APPLIED PEDOLOGY</b>		
<b>Coordinator</b>	Domagoj Rastija	
<b>Collaborators</b>	Vladimir Zebec	
<b>Study year and semester</b>	2nd year, 3rd semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	Number of class hours (L + P + S)	75 (60 L + 15 P)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	Introducing students to the types, limitations, and criteria for land classification. Students acquire knowledge about determining classes and subclasses of agricultural land suitability for various purposes and the methods of agricultural land valuation. Students are also introduced to soil improvement issues—that is, to limitations in intensive agricultural production for specific systematic units, and they receive information on potential soil improvement measures aimed at enhancing the quality of agricultural soils.	
<b>Course enrollment requirements</b>	no preconditions	
<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. identify and evaluate the limitations of agricultural soils;</li> <li>2. assess the suitability or unsuitability of soils for multipurpose use;</li> <li>3. interpret the results of laboratory analyses of soil characteristics for the purposes of soil management; and</li> <li>4. propose potential hydromelioration and agromelioration measures for land management aimed at reducing limitations.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
The right to take the Final Examination is earned by accumulating the minimum required number of assessment points. Assessment points are obtained through class attendance (minimum 70%), participation in class activities, and grades from partial examinations. During the semester, students take two partial examinations (in the 7th and 14th weeks of classes). The Final Examination is mandatory, and a passing grade in the final exam is a prerequisite for a positive final grade. The Final Examination is conducted orally.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Škorić, A. (1991): <i>Sastav i svojstva tla</i>. Fakultet Poljoprivrednih znanosti. Zagreb.</li> <li>2. Bogunović, M. (2009): <i>Vrjednovanje zemljišta i racionalno korištenje prostora</i>. Agronomski fakultet u Zagrebu</li> <li>3. Racz, Z. (1980). <i>Meliorativna pedologija, I. dio</i>, Zagreb: Geodetski fakultet Sveučilišta u Zagrebu.</li> <li>4. Racz, Z. (1981). <i>Meliorativna pedologija, II. dio</i>, Zagreb: Geodetski fakultet Sveučilišta u Zagrebu.</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. FAO (1976): <i>A Framework for Land Evaluation</i>. Food and Agriculture Organizations of the United Nations, Rome, <a href="http://www.fao.org">http://www.fao.org</a></li> <li>2. Priručnik za hidrotehničke melioracije, knjiga II – podloge. Zagreb: DON Hrvatske.</li> <li>3. Nyle, C. Brady, Weil, Ray R. (2002). <i>The Nature and Properties of Soils</i>, 13th ed., Kluwer Academic.</li> <li>4. Gooding, M. J., Davies, W. P. (1997): <i>Wheat Production and Utilization: Systems, Quality and the Environment</i>. CAB International. Wallingford, UK.</li> </ol>		

<b>PRINCIPLES OF SCIENTIFIC PAPER</b>		
<b>Coordinator</b>	Dražen Horvat	
<b>Collaborators</b>	–	
<b>Study year and semester</b>	2nd year, 3rd semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	Number of class hours (L + P + S)	75 (45L + 30S)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	Introduce graduate students to the fundamentals of scientific research in the field of biotechnology, the rules for writing and publishing professional and scientific papers, their publication, and methods of presenting them at scientific and professional conferences.	
<b>Course enrollment requirements</b>	no preconditions	
<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. recognize the stages of scientific work;</li> <li>2. organize the preparation of a scientific or professional paper;</li> <li>3. define basic problems encountered during the preparation of a paper;</li> <li>4. identify a research topic and formulate a basic scientific hypothesis;</li> <li>5. differentiate and categorize the type and category of the paper;</li> <li>6. publish a paper in a relevant publication;</li> <li>7. present the results of scientific or professional research in the form of a poster or multimedia presentation; and</li> <li>8. become familiar with the basic concepts of rhetoric and scientific culture.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
In determining the final grade for students, the following are taken into account: continuous class participation (classroom activities, preparation for lessons, reflective reviews of course content), performance in writing and presenting the seminar paper, and the Final Oral Examination. The oral examination is mandatory for all students. Class attendance is obligatory in accordance with the Regulations on Studies and Studying at the J. J. Strossmayer University of Osijek. If a student is absent for more than 30% of the classes (i.e., more than four times), they lose the right to obtain a signature.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Baban, Lj. i dr. (2000.): <i>Primjena metodologije znanstvenog istraživanja</i>. Sveučilište J. J. Strossmayera u Osijeku, Ekonomski fakultet u Osijeku.</li> <li>2. Gribbing, J. (2001.): <i>Vodič kroz znanost</i>. Biblioteka Luč, Zagreb.</li> <li>3. Ozretić, Đ., Pološki, N. (2003.): <i>Upute za pisanje seminarškoga i diplomskoga rada</i>. Ekonomski fakultet, Zagreb.</li> <li>4. Pavić, H. (1980.): <i>Znanstvene informacije</i>. Školska knjiga, Zagreb.</li> <li>5. Silobrčić, V. (1989.): <i>Znanstveno djelo</i>. Jumena, Zagreb.</li> </ol>		
<b>Additional literature</b>		
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<b>ASSESSMENT OF SOIL SUITABILITY</b>		
<b>Coordinator</b>	Vesna Vukadinović	
<b>Collaborators</b>	Boris Đurđević	
<b>Study year and semester</b>	2nd year, 3rd semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	Number of class hours (L + P + S)	75 (50P + 25V)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	Students acquire the knowledge necessary for assessing land suitability for specific purposes within agricultural production (arable farming, permanent crops, vegetable production, and livestock farming). They become familiar with land suitability classification (land valuation, FAO AEZ, GIS, etc.), mastering the basics of geographic determination of natural conditions and linking them to the physical and chemical properties of soil/land. Through practical examples, they determine the suitability and risks of using specific areas for agricultural production.	
<b>Course enrollment requirements</b>	no preconditions	
<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 explain methods for classifying land according to its production potential;</li> <li>2. compare traditional land valuation methods with modern expert computer systems;</li> <li>3. create a database for land suitability assessment based on selected criteria;</li> <li>4. analyze data and recommend the optimal land use;</li> <li>5. utilize GIS tools to create maps of various scales; and</li> <li>6. define criteria for aggregating quantitative land properties into qualitative suitability classes.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
Students who accumulate the minimum required number of assessment points during the semester are eligible to take the Final Examination. Assessment points are earned based on class attendance (minimum 70%), participation in class activities, and grades from partial examinations. During the semester, students take three partial examinations (in the 6th, 11th, and 16th weeks of classes). The Final Examination is mandatory and consists of both written and oral components. A passing grade in the Final Examination is a prerequisite for a positive final grade.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Vukadinović, V., Vukadinović, V. (2018): <i>Zemljišni resursi – vrednovanje poljoprivrednih zemljišnih resursa</i>. E-book, <a href="http://pedologija.com.hr/Literatura/Zemljisni_resursi.pdf">http://pedologija.com.hr/Literatura/Zemljisni_resursi.pdf</a>.</li> <li>2. Vukadinović, V., Vukadinović, V. (2011): <i>Ishrana bilja</i>. Poljoprivredni fakultet u Osijeku.</li> <li>3. Bogunović, M., Ćorić, R. (2014): <i>Višenamjensko vrednovanje zemljišta i racionalno korištenje prostora</i>. Sveučilište u Mostaru. Mostar.</li> <li>4. Jurišić, M., Plaščak, I. (2009): <i>Geoinformacijski sustav: GIS u poljoprivredni i zaštiti okoliša</i>. Poljoprivredni fakultet u Osijeku.</li> <li>5. FAO (1976): <i>A Framework for Land Evaluation</i>. Food and Agriculture Organizations of the United Nations, Rome, <a href="http://www.fao.org/docrep/x5310e/x5310e00.htm">http://www.fao.org/docrep/x5310e/x5310e00.htm</a></li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Frančula N. (2004): <i>Digitalna kartografija</i>, 3rd exp. ed.. Sveučilište u Zagrebu, Geodetski fakultet. Zagreb.</li> <li>2. FAO (1993): <i>Guidelines for Land-Use Planning</i>. FAO Development Series 1. Rome, <a href="https://www.fao.org/3/t0715e/t0715e00.htm">https://www.fao.org/3/t0715e/t0715e00.htm</a></li> <li>3. Smyth, A.J., Dumanski, J., Spendjian, G., Swift, M. J., Thornton, P. K. (1993): <i>FESLM: An International Framework for Evaluating Sustainable Land Management</i>. World Soil Resources Report, FAO. Rome, <a href="https://www.fao.org/3/T1079E/t1079e00.htm#Contents">https://www.fao.org/3/T1079E/t1079e00.htm#Contents</a></li> </ol>		



4. Rossiter, D. G. (1994): *Lecture Notes: Land Evaluation*. Cornell University Department of Soil, Crop, & Atmospheric Sciences. SCAS Teaching Series No. T94-1, <http://www.css.cornell.edu/faculty/dgr2/teach/le/s494toc.htm>
5. FAO (1996): *Agro-Ecological Zoning: Guidelines*. Food and Agriculture Organizations of the United Nations. Rome, <http://www.fao.org/docrep/w2962e/w2962e00.htm>
6. Shahid, S. A., Taha, F. K., Abdelfattah, M. A. (eds.) (2013): *Developments in Soil Classification, Land Use Planning and Policy Implications*. ISBN 978-94-007-5332-7 (e-book). Springer, Dordrecht / Heidelberg / New York / London.
7. Pavlopoulos, K., Evelpidou, N., Vassilopoulos, A. (2009): *Mapping Geomorphological Environments*. e-ISBN 978-3-642-01950-0. Springer Dordrecht / Heidelberg / New York / London.
8. Laws and regulations on the management and valuation of agricultural land.

<b>PROGRAMS OF FRUIT TREES AND VINE PROTECTION</b>		
<b>Coordinator</b>	Marija Ravlić	
<b>Collaborators</b>	Renata Baličević	
<b>Study year and semester</b>	2nd year, 3rd semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	Number of class hours (L + P + S)	75 (40 L + 15 P + 20 S)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	Familiarization with protection measures for perennial crops. Development of protection programs by crop for fruit and grapevine.	
<b>Course enrollment requirements</b>	no preconditions	
<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. classify protection measures in perennial crops;</li> <li>2. identify chemical and non-chemical control measures in perennial crops;</li> <li>3. calculate the dosage and concentration of a preparation;</li> <li>4. compare the economic threshold with the prepared protection plan; and</li> <li>5. develop and present a protection plan for a selected crop.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
The right to take the Final Examination is earned by accumulating the minimum required number of assessment points. Assessment points are gained through class attendance (minimum 70%), participation in class activities, and grades from partial examinations. During the semester, students are required to prepare an independent seminar paper, which is mandatory. Students present their seminar paper orally, with a duration of 10 to 15 minutes. Throughout the semester, students take three partial examinations. The Final Examination is mandatory, and a passing grade in the Final Examination is a prerequisite for a positive final grade. The Final Examination is conducted orally.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. <i>Glasilo biljne zaštite</i>. Hrvatsko društvo biljne zaštite. Zagreb.</li> <li>2. Ravlić, M. (2017.): <i>Zbirka zadataka iz fitofarmacije</i>. Sveučilište J. J. Strossmayera, Poljoprivredni fakultet u Osijeku.</li> <li>3. Bagi, F., i Bodnar, K. (2012.): <i>Fitomedicina</i>. Univerzitet u Novom Sadu, Poljoprivredni fakultet.</li> <li>4. Maceljiski, M., Cvjetković, B., Ostojić, Z., Igrc Barčić, J. (2002.): <i>Priručnik iz zaštite bilja</i>. Hrvatsko društvo biljne zaštite, Zagreb.</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. publications and sales catalogs of plant protection products; and</li> <li>2. scientific and professional papers from relevant journals and databases.</li> </ol>		

<b>DEVELOPMENT OF TECHNICAL SYSTEMS IN VEGETABLE AND FLOWER GROWING</b>		
<b>Coordinator</b>	Domagoj Zimmer	
<b>Collaborators</b>	Luka Šumanovac	
<b>Study year and semester</b>	2nd year, 3rd semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	Number of class hours (L + P + S)	40L + 35P
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	introduce participants to the development trends of technical systems in vegetable and flower production	
<b>Course enrollment requirements</b>	no preconditions	
<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 development trends of technical systems used in vegetable and flower production;</li> <li>2. plan the optimal number of power and working units for a specific production area and crop structure in closed spaces (greenhouses/tunnels);</li> <li>3. define ecological, economic, and ergonomic parameters in mechanized vegetable and flower production; and</li> <li>4. develop and present a given topic related to the development of technical systems used in vegetable and flower production.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
The right to take the Final Examination is earned by accumulating the minimum required number of assessment points. Assessment points are obtained based on class attendance (minimum 70%), participation in class activities, and the grade for the seminar. Students are required to prepare and defend one seminar paper in the 14th week of classes. The Final Examination is mandatory, and a passing grade in the Final Examination is a prerequisite for a positive final grade. The Final Examination is written.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Bajkin, A.: <i>Mehanizacija u povrtarstvu</i>, Univerzitet u Novom Sadu, Poljoprivredni fakultet, Novi Sad, 1994.</li> <li>2. Bajkin, A., Orlović, S., Ponjičan, O., Somer, D.: <i>Mašine u hortikulturi</i>, Univerzitet u Novom Sadu, Poljoprivredni fakultet, Novi Sad, 2005.</li> <li>3. Čuljat, M., Barčić, J.: <i>Poljoprivredni kombajni</i>, Poljoprivredni institut Osijek, Osijek, 1997.</li> <li>4. Jurišić, M., Plaščak, I.: <i>Geoinformacijske tehnologije: GIS u poljoprivredi i zaštita okoliša</i>, Sveučilište Josipa Jurja Strossmayera u Osijeku, Poljoprivredni fakultet u Osijeku, Osijek, Tisak Zebra, Vinkovci, 2009.</li> <li>5. Martinov, M., et al.: „Tehničko-ekonomske osnove za izbor plastenika/staklenika za komercijalna gazdinstva-samostalna ili udružena,“ <i>Agronomska revija</i>, special ed., no. 1, Ministarstvo poljoprivrede, šumarstva i vodoprivrede Srbije, Novi Sad, 2006.</li> <li>6. Zimmer, R., Košutić, S., Kovačev, I., Zimmer, D.: <i>Integralna tehnika obrade tla i sjetve</i>, Poljoprivredni fakultet u Osijeku, web ed. (university manual), Osijek, 2014.</li> <li>7. 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.: <i>Mehanizacija u biljnoj proizvodnji</i>, Školska knjiga, Zagreb, 1987.</li> <li>2. Storck, H.: <i>Taschenbuch des Gartenbaues</i>, 3rd ed., Verlag Eugen Ulmer GmbH &amp; Co, Stuttgart (Hohenheim), 1994.</li> <li>3. Rannertshauer, J.: <i>Thermische Unkrautbekämpfung</i>, KTBL – Arbeitsblatt Nr. 0665, Berlin, 1990.</li> <li>4. Zimmer, R., et al.: <i>Poljoprivredna tehnika u ratarstvu</i>, Poljoprivredni fakultet u Osijeku, 2009.</li> </ol>		

<b>RURAL TOURISM</b>		
<b>Coordinator</b>	Tihana Sudarić	
<b>Collaborators</b>	Krunoslav Zmaić	
<b>Study year and semester</b>	2nd year, 3rd semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	Number of class hours (L + P + S)	75 (60L + 15S)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	introduce students to the significance and function of rural tourism through the connection between agriculture and tourism, considering spatial, economic, and sociocultural frameworks for the development of rural tourism.	
<b>Course enrollment requirements</b>	no preconditions	
<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. understand the fundamental principles and concepts of tourism;</li> <li>2. explain the development of rural tourism in national and international contexts;</li> <li>3. be familiar with tourism legislation;</li> <li>4. identify the specific features of rural tourism;</li> <li>5. explain the conceptual framework for the development of rural tourism; and</li> <li>6. define strategic directions for tourism development.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
The right to take the Final Examination is earned by accumulating the minimum required number of assessment points. Assessment points are obtained through class attendance (minimum 70%), participation in class activities, and grades from partial examinations, and the seminar. During the semester, students take two partial examinations. The Final Examination is mandatory, and a passing grade in the Final Examination is a prerequisite for a positive final grade. Students present their seminar paper orally, with a duration of 10 to 15 minutes, using a <i>PowerPoint</i> presentation.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Ružić, P. (2010): <i>Ruralni turizam u Hrvatskoj</i>, IMO, Zagreb (book);</li> <li>2. Vukonić, B., Keča K. (2000): <i>Turizam i razvoj: pojam, načela i postupci</i>, Ekonomski fakultet Zagreb i Mikrorad, Zagreb (book);</li> <li>3. Vizjak, A.(1997): <i>Hrvatski turizam u Europskoj i svjetskoj turističkoj razmjeni</i>, Hotelijerski fakultet u Opatiji, Opatija (book);</li> <li>4. Pirjavec, B., Kesar, O. (2002): <i>Počela turizma</i>, Mikrorad i Ekonomski fakultet u Zagrebu, Zagreb (udžbenik); and</li> <li>5. <a href="http://www.oecd.org">www.oecd.org</a> (e-book).</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Vukonić, B., Čavlek, N. (2002): <i>Rethinking of Education and Training for Tourism</i>, Graduate School of Economics/Business, Sveučilište u Zagrebu i Mikrorad, Zagreb (book);</li> <li>2. Muller, H. (2004): <i>Turizam i ekologija</i>, Masmedia, Zagreb (book);</li> <li>3. Sudarić, T. (2004): <i>Poduzetnički marketing u agroturizmu</i>, MS thesis, Ekonomski fakultet u Osijeku, Osijek (theses);</li> <li>4. Trbović Karen, L. (1991): <i>Razvoj sela putem ruralnog razvitka</i>, MS thesis, Ekonomski fakultet u Zagrebu, Zagreb (theses);</li> <li>5. Kušen, E. (2003): „Uređivanje, razvoj i obnova hrvatskog ruralnog prostora,“ <i>Sociologija sela</i>, no. 59/160, pp. 29-45. (papers); and</li> <li>6. Tubić, D. (2019): <i>Ruralni turizam: od teorije do empirije</i>, Visoka škola za menadžment u turizmu i informatici u Virovitici.</li> </ol>		

<b>WILD EDIBLE AND POISONOUS PLANTS</b>		
<b>Coordinator</b>	Marija Ravlić	
<b>Collaborators</b>	Renata Baličević	
<b>Study year and semester</b>	Second year, 3rd semester	
<b>Number of credits and mode of delivery</b>	ECTS	6
	Hours (L + E)	75 (45 L + 30 E)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	Introducing students to the wild flora through its significance and distribution in the Republic of Croatia. Identifying edible and poisonous plants. Determining nutritional values and creating a harvesting calendar.	
<b>Course enrolment requirements</b>	No prerequisites	
<b>Intended course learning outcomes</b>		
Upon successfully completing the module, students will be able to:		
<ol style="list-style-type: none"> <li>6. Analyze the significance and distribution of wild edible plants.</li> <li>7. Group wild edible plants and compare the nutritional value of different plant parts.</li> <li>8. Describe developmental stages and create a harvesting calendar for wild edible plants.</li> <li>9. Define poisonous wild plants and distinguish between edible and poisonous wild plants.</li> <li>10. Classify a systematic overview of edible and poisonous tree species.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
The right to take the final exam is granted by achieving a minimum number of assessment points. Assessment points are earned through class attendance (minimum 70%), participation in class activities, and grades from partial exams. During the semester, students take three partial exams. 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>4. Grlić, Lj. (2005.): Enciklopedija samoniklog jestivog bilja. Ex Libris, Rijeka.</li> <li>5. Glavaš, M. (2019.): Enciklopedija domaćeg ljekovitog bilja. Naklada Ceres, Zagreb.</li> <li>6. Grlić, Lj. (1984.): 99 jestivih i otrovnih bobica. Prosvjeta, Zagreb.</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>4. Domac, R. (2002): Flora Hrvatske, Školska knjiga, Zagreb.</li> <li>5. Knežević, M. (2006): Atlas korovne, ruderalne i travnjačke flore. Poljoprivredni fakultet u Osijeku.</li> <li>6. Znanstveni i stručni radovi iz relevantnih časopisa i baza.</li> </ol>		

<b>ANIMAL HUSBANDRY IN TROPIC AND SUB TROPIC CONDITIONS</b>		
<b>Coordinator</b>	Pero Mijić	
<b>Collaborators</b>	Zvonko Antunović Mirjana Baban Tihomir Florijančić Zlatko Puškadija Tina Bobić Gregić Josip Novoselec	
<b>Study year and semester</b>	Second year, 3rd semester	
<b>Number of credits and mode of delivery</b>	ECTS	6
	Hours (L + E + S)	75 (20 L + 25 E + 20 S)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	Students will acquire knowledge about livestock production in tropical and subtropical regions, focusing on the production aspects of various systems to understand the differences between tropical and European production systems. They will learn about available genetic resources, their utilization, and production potential. Students are trained to develop livestock development projects from technical, organizational, and socio-economic perspectives. They are introduced to methods for evaluating the ecological and economic consequences of livestock development strategies.	
<b>Course enrolment requirements</b>	No prerequisites	
<b>Intended course learning outcomes</b>		
<p>Upon successfully completing the module, students will be able to:</p> <ol style="list-style-type: none"> <li>1. Describe the importance of various livestock species within farming systems in developing countries and identify and interpret the significance of specific livestock products in tropical and subtropical regions.</li> <li>2. Explain the social and cultural role of livestock production in tropical and subtropical areas, and identify and describe livestock species critical for human survival in these regions.</li> <li>3. Recommend effective breeding methods to improve the genetic potential of livestock in developing countries and develop procedures for project design to analyze livestock production potential in these areas.</li> <li>4. Highlight potential limitations in technology transfer.</li> <li>5. Critically evaluate the latest scientific and professional literature and draw appropriate conclusions.</li> <li>6. Propose breeding strategies to enhance resource utilization in livestock production in tropical and subtropical regions.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
<p>The methods of monitoring and assessing students' knowledge will include written and oral examinations. The final grade will be determined based on continuous participation in class (class activity, preparation for lessons, and reflective analysis of the lecture content), continuous monitoring and knowledge assessment (partial exams), and the final oral exam. Attendance of partial exams is not mandatory, and taking the final exam is not required if a student passes all three partial exams (hence the different weightings in the final grade). Attendance is mandatory, in accordance with the Regulations on Studies and Studying at the Josip Juraj Strossmayer University of Osijek. If a student is absent for more than 30% of classes (more than four sessions), they lose the right to sign the course.</p>		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Knežević, I., Mijić, P., Antunović, Z., Baban, M. (2009): Stočarstvo u tropskim i suptropskim uvjetima. Poljoprivredni fakultet u Osijeku, Osijek.</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Legel, S. (1989): Nutztiere der Tropen und Subtropen. Band 1: Rinder. SHirzel Verlag, Leipzig.</li> </ol>		

2. Pagot, J. (1992): Animal Production in the Tropics and Subtropics. The Macmillan Press Ltd.
3. Payne, W. J. A., Hodges, J. (1997): Tropical Cattle, origins, breeds and breeding policies. Blackwell Science, Ltd.
4. Payne, W. J. A., Wilson, R. T. (1999.): An Introduction to Animal Husbandry in the Tropics. Blackwell Science, Ltd.

<b>MACHINES AND DEVICES IN ECOLOGICAL PROTECTION AND PLANT CARE</b>		
<b>Coordinator</b>	Đuro Banaj	
<b>Collaborators</b>	Vjekoslav Tadić	
<b>Study year and semester</b>	Second year, 3rd semester	
<b>Number of credits and mode of delivery</b>	ECTS	6
	Hours (L+E)	75 (60 L + 15 E)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	The module program "Machines and Devices in Ecological Protection and Plant Care" enables students to acquire fundamental theoretical and technical-technological management knowledge about the functioning of machinery and equipment in limited crop production. It also aims to achieve proficiency in understanding their technical-exploitation characteristics, reducing inputs, and minimizing pesticide use in limited farming practices.	
<b>Course enrolment requirements</b>	No prerequisites	
<b>Intended course learning outcomes</b>		
Upon successfully completing the module, students will be able to:		
<ol style="list-style-type: none"> <li>1. Select and apply appropriate technology in the ecological production of arable crops.</li> <li>2. Analyze the advantages and disadvantages of using ecological practices in arable farming.</li> <li>3. List the primary tasks of technical systems in basic soil preparation and sowing.</li> <li>4. Describe the factors influencing the selection of agricultural machinery.</li> <li>5. Identify basic systems and their adjustment methods.</li> <li>6. Differentiate technical systems, types, and additional equipment.</li> <li>7. Choose technical systems based on the requirements of the applied cultivation technology.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
The right to take the final exam is granted by achieving the minimum required number of assessment points. Assessment points are earned through class attendance (minimum 70%), participation in class activities, and grades from partial exams. 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. Banaj, Đ., Tadić, V., Banaj Željka, Lukač., P.(2013): Unapređenje tehnike aplikacije pesticida, Poljoprivredni fakultet u Osijeku, Osijek,</li> <li>2. Zimmer, R., Košutić, S., Zimmer, D. (2009.): Poljoprivredna tehnika u ratarstvu, Udžbenik Sveučilišta J. J. Strossmayera u Osijeku.</li> <li>3. Jurišić, M., Plaščak, I.: Geoinformacijski sustavi-GIS u poljoprivredi i zaštiti okoliša, Poljoprivredni fakultet u Osijeku, Osijek, 2009.</li> <li>4. Znaor, D. (1996): Ekološka poljoprivreda, Nakladni zavod Globus, Zagreb, 1996</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Kisić, I., (2014.): Uvod u ekološku poljoprivredu, Agronomski fakultet Sveučilišta u Zagrebu, Zagreb.</li> <li>2. Zimmer, R., Košutić, S., Zimmer, D., Kovačev, I. (2013). Integralna tehnika u obradi tla i sjetvi. Osijek: Sveučilište J. J. Strossmayera u Osijeku.</li> <li>3. Banaj, Đ., Šmrčković P. (2003): Upravljanje poljoprivrednom tehnikom, Poljoprivredni fakultet, Osijek</li> </ol>		



<b>MANAGEMENT SYSTEMS IN FRUIT GROWING AND VITICULTURE</b>		
<b>Coordinator</b>	Mato Drenjančević	
<b>Collaborators</b>	Vladimir Jukić Aleksandar Stanisavljević	
<b>Study year and semester</b>	Second year, 3rd semester	
<b>Number of credits and mode of delivery</b>	ECTS	6
	Hours (L)	75 (75 L)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	Introducing students to the specific characteristics of the selected production model. Determining the importance and prevalence of fruit species and grapes outside the framework of conventional production.	
<b>Course enrolment requirements</b>	No prerequisites	
<b>Intended course learning outcomes</b>		
Upon successfully completing the module, students will be able to:		
<ol style="list-style-type: none"> <li>1. Compare the advantages and disadvantages of production systems for fruit crops.</li> <li>2. Define the technological characteristics of fruit production based on its intended use (fresh consumption, confectionery industry, juice production, and alcoholic beverage production).</li> <li>3. Argue the success of integrated and ecological fruit production.</li> <li>4. Describe the advantages and disadvantages of production systems in viticulture.</li> <li>5. Define the technological characteristics of viticulture production based on its intended use (fresh consumption, processed products, wine production, juice production, and alcoholic beverage production).</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
The right to take the final exam is granted by achieving the minimum required number of assessment points. Assessment points are earned through class attendance (minimum 70%), participation in class activities, and grades from partial exams. 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. Mirošević, N., Karoglan-Kontiće, J. (2008): Vinogradarstvo, Globus, Zagreb</li> <li>2. Gvozdenović, D., Davidović. M. (1987.): Berba, čuvanje i pakovanje voća, Nolit, Beograd</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Bulatović, S. (1989): Savremeno voćarstvo, Nolit, Beograd</li> <li>2. Fregoni, M. (1986.): Viticultura generale, Universita Cattolica – Piacenza; REDA, Roma</li> <li>3. Burić, D. (1981.): Vinogradarstvo I, Ćirpanov, Novi Sad</li> </ol>		

<b>DECISION SUPPORT SYSTEMS IN AGRICULTURE</b>		
<b>Coordinator</b>	Ružica Lončarić	
<b>Collaborators</b>	-	
<b>Study year and semester</b>	Second year, 3rd semester	
<b>Number of credits and mode of delivery</b>	ECTS	6
	Hours (L + S)	75 (50 L + 25 S)
<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>		
Upon successfully completing the module, students will be able to:		
<ol style="list-style-type: none"> <li>1. Define and distinguish between a business entity and its environment, the informational and communication system of the business entity, the marketing information system, information flow in the production-sales chain, and modern information technologies.</li> <li>2. Define decision-making phases and strategies, as well as the elements and attributes that define them.</li> <li>3. Identify and explain types of decisions and types of decision-making support.</li> <li>4. Define levels within the system, feedback loops for system optimization, and static and dynamic systems.</li> <li>5. Interpret all phases of decision-support system development based on economic characteristics, particularly the interaction of ecological conditions, agronomic techniques, and the economic viability of planned production.</li> <li>6. Present a computer-based production system through a presentation and seminar.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
The right to take the final exam is granted by achieving the minimum required assessment points. Assessment points are earned based on attendance, participation in class activities, tasks during lectures and seminars, seminar evaluation, and grades from partial exams. During the semester, students are required to independently prepare a seminar paper, which is mandatory. Additionally, students take two partial exams during the course of the lectures. The final exam is mandatory, and a passing grade on the final exam is a prerequisite for a positive final grade. The final exam may be written or oral.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Lončarić, Z. i Lončarić, R. (2010): Kompjutorski sustavi odlučivanja. Poljoprivredni fakultet u Osijeku. Osijek</li> <li>2. Srića, V. (ur.) (1999): Menedžerska informatika. MEP Consult, Delfin, HITA Poslovna akademija. Zagreb</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Jones, J.W., Mishoe, J.W., Boote, K.J. (1987): Introduction to simulation and modeling. Food&amp;Fertilizer Technology Center. Technical Bulletin 100. (radovi)</li> <li>2. Segetlija, Z., Lamza-Maronić, M. (2000): Distribucija, logistika, informatika. Sveučilište J.J. Strossmayera. Ekonomski fakultet Osijek (knjiga)</li> </ol>		

<b>MODERN METHODS IN COST ACCOUNTS</b>		
<b>Coordinator</b>	Ljubica Ranogajec	
<b>Collaborators</b>	Ana Crnčan	
<b>Study year and semester</b>	Second year, 3rd semester	
<b>Number of credits and mode of delivery</b>	ECTS	6
	Hours (L + E)	75 (60 L + 15 E)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	Explain the methodology of various contemporary systems for calculating production and operational costs in agricultural production.	
<b>Course enrolment requirements</b>	No prerequisites	
<b>Intended course learning outcomes</b>		
Upon successfully completing the module, students will be able to:		
<ol style="list-style-type: none"> <li>1. Classify the concept of costs and revenues, and explain the accounting bases for cost management.</li> <li>2. Describe the problems and methods of allocating overhead costs in agricultural production.</li> <li>3. Identify quality costs and costs of non-quality in the production and business process.</li> <li>4. Explain contemporary methods of cost calculation: DC, ABC, EVA, BSC, Benchmarking, and Kaizen.</li> <li>5. Calculate and compare financial results by applying different cost calculation methods.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
The right to take the final exam is achieved by collecting a minimum number of assessment points. Assessment points are earned based on class attendance (at least 70%), participation in class activities, and the results of partial exams. During the semester, students take two partial exams (in the 7th and 15th week of classes). The final exam is mandatory, and a passing grade on the final exam is a prerequisite for a positive overall grade. The final exam is oral.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Belak V. (1995.) Menadžersko računovodstvo, Računovodstvo, revizija i financije, Zagreb</li> <li>2. Chadwick, L. (2000.) Osnove upravljačkog računovodstva, Mate, Zagreb</li> <li>3. Karić, M. (2001): Upravljanje troškovima, Ekonomski fakultet u Osijeku, Osijek</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Potnik Galić, K. (2018): Strateško upravljanje troškovima, Veleučilište u Požegi, Požega</li> <li>2. Drljača, M. (2004): Metode upravljanja troškovima, Električka, Br. 4, Stilloeks, Zagreb, 2004, str. 16-22. ISSN 1332-0122.</li> <li>3. <a href="https://bib.irb.hr/datoteka/580523.Metode_upravljanja_trokovima.pdf">https://bib.irb.hr/datoteka/580523.Metode_upravljanja_trokovima.pdf</a></li> </ol>		

<b>PESTS IN VEGETABLES AND FLOWERS</b>		
<b>Coordinator</b>	Ankica Sarajlić	
<b>Collaborators</b>	-	
<b>Study year and semester</b>	Second year, 3rd semester	
<b>Number of credits and mode of delivery</b>	ECTS	6
	Hours (L + S)	75 (45 L + 30 E)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	Introducing students to pests and the principles of protection in vegetables and flowers.	
<b>Course enrolment requirements</b>	No prerequisites	
<b>Intended course learning outcomes</b>		
<p>Upon successfully completing the module, students will be able to:</p> <ol style="list-style-type: none"> <li>1. Describe the biology and ecology of pests in vegetables and flowers.</li> <li>2. Identify symptoms of pest attacks and methods of sampling for pest presence.</li> <li>3. Develop methods for integrated pest management in vegetables and flowers.</li> <li>4. Recommendations for chemical protection.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
<p>The right to take the final exam is achieved by collecting a minimum number of assessment points. Assessment points are earned based on class attendance (at least 70%), participation in class activities, and the results of partial exams. During the semester, students take two partial exams (in the 7th and 15th week of classes). The final exam is mandatory, and a passing grade on the final exam is a prerequisite for a positive overall grade. The final exam is oral.</p>		
<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. Maceljski, M., Cjetković, B., Ostojić, Z., Igrc-Barčić, J., Pagliarini, M., Oštrec, Lj., Barić, K., Čizmić, I. (2004): Štetočinke povrća, Zrinski, Čakovec</li> <li>3. Maceljski, M. (2002): Poljoprivredna entomologija. Zrinski Čakovec</li> <li>4. M.Maceljski i sur. (1997): Priručnik iz zaštite bilja, Izd. Zavod za zaštitu bilja u poljoprivredi i šumarstvu R. Hrvatske, Zagreb</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Students will be continuously directed to the latest scientific papers, books, and manuals in the field of entomology as supplementary material for clarifying specific topics.</li> </ol>		

<b>PESTS IN ARABLE CROPS</b>		
<b>Coordinator</b>	Ivana Majić	
<b>Collaborators</b>	-	
<b>Study year and semester</b>	Second year, 3rd semester	
<b>Number of credits and mode of delivery</b>	ECTS	6
	Hours (L + E + S)	75 (30 L + 10 E + 35 S)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	To familiarize students with the most significant pests of arable crops.	
<b>Course enrolment requirements</b>	No prerequisites	
<b>Intended course learning outcomes</b>		
<p>Upon successfully completing the module, students will be able to:</p> <ol style="list-style-type: none"> <li>1. Describe the biology and ecology of pests in arable farming.</li> <li>2. Identify symptoms of pest attacks and methods of sampling.</li> <li>3. Develop integrated pest management strategies in arable farming.</li> <li>4. Selection of pesticides based on crops and pests, timing and method of application, and pre-harvest intervals.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
<p>Students are required to produce an independent seminar paper, which is mandatory. The seminar paper will be presented orally. After completing the thematic unit, a partial exam will be held. When forming the final grade for students, continuous monitoring of teaching (class activity, preparation for lessons, reflective review of teaching content), the seminar paper, and partial or final exams will be considered.</p> <p>Attendance is mandatory in accordance with the Regulations on Studies and Studying at the Josip Juraj Strossmayer University in Osijek.</p>		
<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. (2002): Poljoprivredna entomologija. Zrinski Čakovec</li> <li>3. Ćosić J., Ivezić M., Štefanić E., Šamota D., Kalinović I., Rozman V., Liška A., Ranogajec Lj. (2008): Najznačajniji štetnici bolesti i korovi u ratarskoj proizvodnji, Osječko-baranjska županija</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Scientific papers relevant to individual thematic units</li> </ol>		

<b>PESTS IN ORCHARDS AND VINEYARDS</b>		
<b>Coordinator</b>	Ankica Sarajlić	
<b>Collaborators</b>	Jelena Ilić Renata Baličević Brankica Svitlica	
<b>Study year and semester</b>	Second year, 3rd semester	
<b>Number of credits and mode of delivery</b>	ECTS	6
	Hours (L + S)	75 (60 L + 15 S)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	Introduce students to the biology, ecology, and control measures of the most important pests, pathogens, and weeds in orchards and vineyards, as well as the methods of control.	
<b>Course enrolment requirements</b>	No prerequisites	
<b>Intended course learning outcomes</b>		
Upon successfully completing the module, students will be able to:		
<ol style="list-style-type: none"> <li>1. Describe the biology and systematics of the most important harmful insects and nematodes in fruit growing and viticulture.</li> <li>2. Identify symptoms on plants caused by attacks of harmful insects and phytopathogenic nematodes.</li> <li>3. Recommend a control plan for harmful insects and nematodes in permanent crops.</li> <li>4. Describe the biology and systematics of the most important pathogens in fruit growing and viticulture.</li> <li>5. Identify symptoms of plant diseases in fruit growing and viticulture.</li> <li>6. Recommend protection against plant diseases in fruit growing and viticulture.</li> <li>7. Describe the biology and ecology of the most significant weeds in orchards and vineyards.</li> <li>8. Recommend a weed control plan for orchards and vineyards.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
During the course, students have 3 partial written exams and a final exam. In the formation of the final grade for students, continuous monitoring of the course (activity in class, preparation for lessons, reflective review of course content) and partial knowledge assessments, as well as the final exam, are taken into account.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Ivezić M. (2003.): Štetnici vinove loze i voćaka. Veleučilište u Požegi i Rijeci. 1- 133.</li> <li>2. Ivezić, M. (2014): Fitonematologija. Grafika do.o.o. Osijek, p.p. 109.</li> <li>3. Ciglar, I. (1998.): Integrirana zaštita voćnjaka i vinograda. Sveučilište u Zagrebu. Agronomski fakultet, 5-301.</li> <li>4. Maceljski, M., Cvjetković, B., Ostojić, Z., Barić, B. (2006.): Štetočinje vinove loze. Sveučilište u Zagrebu. Agronomski fakultet, 5-319.</li> <li>5. Kišpatić, J (1992.): Bolesti voćaka i vinove loze. Sveučilište u Zagrebu. Agronomski fakultet, 1-292.</li> <li>6. Jurković, D., Ćosić, J. (2003.): Zaštita vinograda i voćnjaka od uzročnika bolesti. Veleučilište u Požegi. Skripta, 1-83.</li> <li>7. Ćosić, J., Jurković, D., Vrandečić, K. (2006.): Praktikum iz fitopatologije. www.fazos.hr</li> <li>8. Cvjetković, B. (2010.): Mikoze i pseudomikoze voćaka i vinove loze. Zrinski d.d., Čakovec, 418-505.</li> <li>9. Knežević M. (2006.): Atlas korovne, ruderalne i travnjačke flore, Sveučilište J. J. Strossmayera u Osijeku , Poljoprivredni fakultet u Osijeku.</li> <li>10. Baličević R., Ravlić M. (2014.): Herbicidi u zaštiti bilja , Sveučilište J. J. Strossmayera u Osijeku , Poljoprivredni fakultet u Osijeku.</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Brmež, M., Jurković, D., Šamota, D., Baličević, R., Štefanić, E., Ranogajec, Lj. (2010): Najznačajniji štetnici, bolesti i korovi u voćarstvu i vinogradarstvu. Osječko-baranjska županija, Krrmopak, Valpovo, p.p.60.</li> <li>2. Ivezić, M. (2008): Entomologija- kukci i ostali štetnici u ratarstvu. Grafika do.o.o. Osijek, p.p. 202.</li> </ol>		

<b>TECHNICAL SYSTEMS IN IRRIGATION</b>		
<b>Coordinator</b>	Monika Marković	
<b>Collaborators</b>	Alka Turalija Antonija Kojić	
<b>Study year and semester</b>	Second year, 3rd semester	
<b>Number of credits and mode of delivery</b>	ECTS	6
	Hours (L + E)	75 (45 L + 30 E)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	Introduce students to modern technical systems – machines and equipment for irrigation of agricultural crops, as well as basic technical projects and the operation of machines and equipment.	
<b>Course enrolment requirements</b>	No prerequisites	
<b>Intended course learning outcomes</b>		
<p>Upon successfully completing the module, students will be able to:</p> <ol style="list-style-type: none"> <li>1. Explain the issues of improper water-air regime and technical systems for irrigation.</li> <li>2. Understand the challenges in designing irrigation system equipment.</li> <li>3. Select appropriate irrigation methods and corresponding machinery.</li> <li>4. Determine irrigation system components and technical performance.</li> <li>5. Define hydraulic elements in irrigation systems.</li> <li>6. Familiarize with the specifics of irrigation for different crops.</li> <li>7. Recognize the importance of maintaining irrigation equipment.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
<p>The right to take the final exam is earned by accumulating a minimum number of assessment points. Assessment points are earned based on attending classes (at least 70%), participation in class activities, and results 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 positive grade from the final exam is a prerequisite for a positive final grade.</p>		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Šimunić, I. (2013.): Ueđenje 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. Obelić, V. (1960.): Osnovni elementi navodnjavanja kišenjem.</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. Grupa autora: Priručnik za hidrotehničke melioracije. II kolo Navodnjavanje. Knjiga 1 – 6. Društvo za odvodnju i navodnjavanje Hrvatske. Zagreb.</li> </ol>		

<b>TECHNICAL EXPLOITATION EXPERTISE OF DEVICES IN PERMANENT PLANTATIONS PROTECTION</b>		
<b>Coordinator</b>	Đuro Banaj	
<b>Collaborators</b>	Vjekoslav Tadić	
<b>Study year and semester</b>	Second year, 3rd semester	
<b>Number of credits and mode of delivery</b>	ECTS	6
	Hours (L + E)	75 (45 L + 30 E)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	Familiarizing students with modern laboratory and field methods for the expertise of machinery and equipment used for the protection of permanent crops. The content enables a detailed understanding of machines and devices, their design, components, operating theory, regulation, and work quality.	
<b>Course enrolment requirements</b>	No prerequisites	
<b>Intended course learning outcomes</b>		
Upon successfully completing the module, students will be able to:		
<ol style="list-style-type: none"> <li>1. Explain in detail the principles of operation of devices for the protection of permanent crops such as fruit orchards and vineyards, the theory of operation of nozzles and ventilators, and the movement of a homogenized solution after it exits the nozzles.</li> <li>2. Conduct technical expertise and determine individual parameters through calculations.</li> <li>3. Perform laboratory and field testing of machinery and devices for the protection of permanent crops (sprayers, mist blowers, dusters, and foggers).</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
The right to take the final exam is earned by collecting a minimum number of points. Points are awarded based on attending classes (at least 70%), participation in class activities, and grades from partial exams. During the semester, students take two written partial exams (in the 7th and 15th week of classes). The final oral exam is mandatory, and a positive grade on the final exam is a prerequisite for a positive final grade.		
<b>Obligatory literature</b>		
8.		
<b>Additional literature</b>		
3.		



<b>THE TECHNIQUE OF STORING A VOLUMINOUS STERN</b>		
<b>Coordinator</b>	Irena Rapčan	
<b>Collaborators</b>	Vjekoslav Tadić	
<b>Study year and semester</b>	Second year, 3rd semester	
<b>Number of credits and mode of delivery</b>	ECTS	6
	Hours (L + E)	75 (60 L + 15 E)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	Acquiring theoretical and practical knowledge on the use of technical systems for handling bulk feed (alfalfa, clover-grass mixtures, and silage corn) from the field to the dryers or horizontal silos.	
<b>Course enrolment requirements</b>	No prerequisites	
<b>Intended course learning outcomes</b>		
Upon successfully completing the module, students will be able to:		
<ol style="list-style-type: none"> <li>1. Describe the importance of bulk feed.</li> <li>2. Describe the general and economic significance of crops grown for bulk feed, the basic systematics of these crops, the agroecological factors for growing these crops (the requirements of individual crops for climate and soil), and silage-making.</li> <li>3. Describe the machines, dryers, and horizontal silos used in the cultivation and storage of bulk feed.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
The final grade is determined based on continuous monitoring of lectures, participation in classes, ongoing monitoring and knowledge assessment (partial exams), and the final exam (both written and oral). Attending partial exams is not mandatory, nor is attending the final exam if the student has passed all three partial exams earlier. Attending classes is mandatory in accordance with the university's regulations on studies and studying. If a student miss more than 30% of the classes (more than 4 times), they lose the right to receive a signature for the course. Students are evaluated and graded based on all the aforementioned elements of their work, according to the established grading criteria for each element, which students are familiar with. To pass, students must achieve at least a passing grade in each of the individual elements of monitoring and assessment.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Zimmer Robert, Banaj Đuro, Brkić Duško, Košutić Silvio (1997): <i>Mehanizacija u ratarstvu</i>, Poljoprivredni fakultet Osijek</li> <li>2. Gagro Mirko (1998): „Ratarstvo obiteljskog gospodarstva. Industrijsko i krmno bilje.“ Hrvatsko agronomsko društvo, Zagreb</li> <li>3. Katalinić I., Pejaković D., Brčić J. (2000): <i>Spremanje sjenaže</i>, Hrvatski zavod za poljoprivrednu savjetodavnu službu, Zagreb</li> <li>4. Stjepanović Mirko, Steiner Z., Domaćinović Matija, Bukvić Gordana (2002): <i>Konzerviranje i korištenje krme</i>, Agroekološko društvo u Osijeku.</li> <li>5. Jurišić M. (2009): <i>AgBase – Priručnik za uzgoj bilja, I. Tehnologija (agrotehnika) važnijih ratarskih kultura</i>, MPŠVG RH - VIP projekt VII-5-16/07, Poljoprivredni fakultete, Osijek.</li> <li>6. Stjepanović Mirko, Zimmer Robert, Tucak Marijana, Bukvić Gordana, Popović Svetislav, Štafa Zvonimir (2009): „Lucerna“, Poljoprivredni fakultet Osijek i Poljoprivredni institut Osijek.</li> <li>7. Rapčan Irena (2014): <i>Priručnik za modul Bilinogojstvo, preddiplomski sveučilišni i stručni studij Mehanizacija</i>, Poljoprivredni fakultet Osijek.</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Vratarić Marija, Sudarić Aleksandra (2000): „Soja“, Poljoprivredni institut Osijek.</li> <li>2. Čuljat Mile (2003): <i>Uskladištenje krme u crijeva AG-BAG prešom</i>, PUP, 4, Osijek.</li> <li>3. Čuljat Mile (2003): <i>Silaža u crijevima od folije s AG-BAG prešama</i>, PUP, 2, Osijek.</li> </ol>		

<b>FIELD RESEARCHES</b>		
<b>Coordinator</b>	Vladimir Zebec	
<b>Collaborators</b>	Domagoj Rastija	
<b>Study year and semester</b>	Second year, 3rd semester	
<b>Number of credits and mode of delivery</b>	ECTS	6
	Hours (L + E)	75 (25 L + 50 E)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	The aim is to familiarize students with field and laboratory research in pedology, with a focus on the purpose of the research. Students gain experience in field and laboratory work, as well as in interpreting the obtained research results for the purpose of determining soil types, assessing their suitability, and creating specialized pedological maps.	
<b>Course enrolment requirements</b>	No prerequisites	
<b>Intended course learning outcomes</b>		
Upon successfully completing the module, students will be able to:		
<ol style="list-style-type: none"> <li>1. Plan field research activities</li> <li>2. Identify and differentiate basic pedological horizons</li> <li>3. Determine the morphological characteristics of the soil</li> <li>4. Perform sampling in disturbed and undisturbed conditions</li> <li>5. Determine basic physical and chemical properties in soil samples in the laboratory</li> <li>6. Interpret the obtained results and familiarize students with the basics of mapping and creating specialized pedological maps</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
The right to take the final exam is earned by collecting a minimum number of assessment points. Assessment points are obtained based on class attendance (at least 70%), class participation, and the results of partial exams. During the semester, students take two partial exams (in the 7th and 15th week of classes). The final exam is mandatory, and a positive grade in 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. Škorić, A. (1982): Priručnik za pedološka istraživanja. Fakultet Poljoprivrednih znanosti . Zagreb.</li> <li>2. USDA (1993): Soil Survey Manual. Survey Division Staff . Soil Conservation Service. U.S. Department of Agriculture, Handbook 18.</li> <li>3. Bogunović, M. (1994): Pedološko kartiranje, radni materijal za skriptu. Fakultet poljoprivrednih znanosti . Zagreb.</li> <li>4. Metodika terenskog ispitivanja zemljišta (1966):. Knjiga IV. Beograd.</li> <li>5. ISRIC (1995): Procedures for Soil Analysis. ISRIC. Wageningen.</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Munsell Soil Color Charts. Munsell Color Macbeth Division of Kollmorgen corporation (1973): Baltimore, Maryland 21218.</li> <li>2. USDA: Soil Survey laboratory Methods Manual. Soil Survey Investigations Report No.42, Version 3.0. U.S. Department of Agriculture, National Soil Survey Conversation Service.</li> </ol>		

<b>HEAVY METALS IN THE ANTROPOSPHERE</b>		
<b>Coordinator</b>	Zdenko Lončarić	
<b>Collaborators</b>	Vladimir Ivezić Marcela Šperanda Zvonko Antunović Tihomir Florijančić	
<b>Study year and semester</b>	Second year, 3rd semester	
<b>Number of credits and mode of delivery</b>	ECTS	6
	Hours (L + S)	75 (65 L + 10 S)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	Integrating knowledge about heavy metals and trace elements from the pedological, agrochemical, fertilization, ecological, physiological, and nutritional perspectives. Dissecting and emphasizing the potential and impact of agriculture on the environment and food quality concerning heavy metals. Preparing participants for interdisciplinary research and professional activities in the field of environmental protection – agriculture – food quality.	
<b>Course enrolment requirements</b>	No prerequisites	
<b>Intended course learning outcomes</b>		
Upon successfully completing the module, students will be able to:		
<ol style="list-style-type: none"> <li>1. Classify heavy metals and trace elements based on their chemical properties and physiological significance.</li> <li>2. Explain the origin of heavy metals in soils.</li> <li>3. Describe the anthropogenic input and the impact of agriculture on the accumulation of heavy metals in agroecosystems.</li> <li>4. Explain the legal regulations regarding the concentration of heavy metals in water, soil, fertilizers, agricultural products, and food.</li> <li>5. Interpret the results of chemical analyses of heavy metal concentrations in soil, fertilizers, and agricultural products.</li> <li>6. Describe the importance and characteristics of plant and animal organisms as filters in the transfer of heavy metals into the food chain.</li> <li>7. Explain the role of heavy metals in physiological processes of plants and animals.</li> <li>8. Describe the processes of transfer of essential and harmful heavy metals into the food chain.</li> <li>9. Apply measures to reduce the transfer of harmful heavy metals into the food chain.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
Elements of monitoring and assessment	Workload in ECTS	Percentage of final grade
Attendance at lectures	2,6	-
Continuous monitoring of the course (activity in class, preparation for lectures, reflective review of course content)	0,8	20%
Continuous monitoring and knowledge assessment (partial exams) (partial exams)	1,2	0-40%
Seminar paper	0,4	20%
Final exam	1,0	10-50%
Total	6	100%
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Lončarić, Z. (ur.) (2015.): Utjecaj poljoprivrede na kakvoću hrane u pograničnome području. Poljoprivredni fakultet Sveučilišta Josipa Jurja Strossmayera u Osijeku. Osijek.</li> <li>2. Lončarić, Z. (2012.): Teški metali u antroposferi. Poljoprivredni fakultet u Osijeku.</li> <li>3. Lončarić, Z. (2012.): Analiza teških metala i elemenata u tragovima u tlima, gnojivima, biljnim i animalnim tkivima.</li> </ol>		

4. Šperanda, M., Antunović, Z., Florijančić, T. (2012.): Teški metali u agrozoocenoza. Poljoprivredni fakultet u Osijeku.
5. ISO standardi, EN norme, HRN norme, zakoni i pravilnici

**Additional literature**

1. Hooda, Peter (2010.): Trace elements in soils. Blackwell Publishing Ltd. West Sussex. United Kingdom.
2. Schleger, Peter (2008.): Trace Elements in Animal Production Systems. Wageningen Academic Publishers. The Netherlands.
3. Olsson I.M, (2002.): Biomonitoring of cadmium in cattle, pigs and humans. Swedish University of agricultural sciences. Uppsala, Sweden.
4. Suttle, N. F. (2010.): Mineral nutrition of livestock, CABI Publishing
5. Kastori, R., Bogdanović, D., Kadar, I., Milošević, N., Sekulić, P., Pucarević, M. (2006.): Uzorkovanje zemljišta i biljaka nezagađenih i zagađenih staništa. Naučni institut za ratarstvo i povrtarstvo. Novi Sad.

<b>TRADITIONAL AND INDIGENOUS PERENNIAL CROPS</b>		
<b>Coordinator</b>	Aleksandar Stanisavljević	
<b>Collaborators</b>	Dejan Bošnjak	
<b>Study year and semester</b>	Second year, 3rd semester	
<b>Number of credits and mode of delivery</b>	ECTS	6
	Hours (L + E)	75 (70 L + 5 E)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	Introduce students to the biology of specific indigenous woody species. Analyze their current utility and determine their potential for future selection (production, pharmacological, nutritional, and landscape value). Identify the occurrence of these species in specific locations and conduct mapping. Explore possibilities for preserving their genetic pool as a landscape and design element within traditional gardens. Assess their potential for commercial cultivation.	
<b>Course enrolment requirements</b>	No prerequisites	
<b>Intended course learning outcomes</b>		
Upon successfully completing the module, students will be able to: <ol style="list-style-type: none"> <li>1. Describe and define the values and economic significance of indigenous fruit species in Croatia.</li> <li>2. Understand the principles of selective breeding and their inclusion in commercial production based on usage types.</li> <li>3. Interpret the presence of traditional and indigenous species within traditional gardens.</li> <li>4. Describe the morphological characteristics and physiology of specific species.</li> <li>5. Recognize the importance of traditional fruit and grape cultivation within traditional gardens.</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 lectures. In the second part of the module, fieldwork and exercises will be organized in an orchard. Participation in fieldwork is mandatory. During this phase, students will prepare an independent seminar paper, which is also mandatory. Each student will present their seminar orally, lasting 10 to 15 minutes, using a PowerPoint presentation. The presentation schedule will be agreed upon in advance. After completing the lectures and exercises, students will take the final oral exam. It is recommended that students take notes during lectures and prepare for the exam using the required literature. PowerPoint presentations will be used during lectures to explain the discussed content, and printed copies (handouts) will be made available to students. The final grade will be determined based on continuous monitoring of class activities (active participation, preparation for class, and reflective analysis of lecture content), as well as the seminar paper. The seminar will be evaluated on the clarity, accuracy, and relevance of the written information, along with the overall technical and visual quality of the presentation. Attendance is mandatory, in accordance with the Rules on Study and Studying at the Josip Juraj Strossmayer University of Osijek. Students who miss more than 30% of the total class hours lose the right to obtain a signature.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Bernkopf, S., Keppel, H., Novak R. (2003): Apfel, birnen und steinobst, Club niederosterreich, Wien</li> <li>2. Gaši, F., Kurtović, M., Nikolić, D., Pejić, I.: (2013): Genetika i oplemenjivanje jabuke, Poljoprivredno-prehrambeni fakultet Sarajevo, Sarajevo</li> <li>3. Vrbanc, K., Jakopec, L., Ilijaš, I., Lučić, D. (2007): Priručnik tradicionalnih i autohtonih vrsta i sorata voćaka visoko-stablašica, Kerschoffeset d.o.o., Zagreb</li> <li>4. Jermić, T. (2007): Bazga, važnost, upotreba, uzgoj, Hrvatska sveučilišna naklada, Zagreb</li> <li>5. Jemrić, Tomislav (2007): Cijepljenje i rezidba voćaka, Naklada Uliks, Rijeka</li> <li>6. Tijekom izvođenja nastave odrediti će se najnoviji radovi objavljeni u referentnim međunarodnim časopisima koji će služiti za pripremu seminara</li> <li>7. <a href="https://fruit.cornell.edu/">https://fruit.cornell.edu/</a></li> <li>8. <a href="https://www.canr.msu.edu/fruit/">https://www.canr.msu.edu/fruit/</a></li> </ol>		

**Additional literature**

1. Westwood, M. N. (1993): Temperature-zone pomology: physiology and culture, Timber Press, Inc., USA
2. Baugher, T., Singha, S. (2003): Concise Encyclopedia of Temperate Tree Fruit, Haworth Press
3. Gvozdenović, D., Davidović, M. (1987): Berbe, čuvanje I pakovanje voća, Nolit, Beograd.
4. <https://www.fao.org/home/en>

<b>TRANSPORT SYSTEMS IN FRUIT , VINE AND WINE PRODUCTION</b>		
<b>Coordinator</b>	Luka Šumanovac	
<b>Collaborators</b>	Darko Kiš Vjekoslav Tadić Domagoj Zimmer	
<b>Study year and semester</b>	Second year, 3rd semester	
<b>Number of credits and mode of delivery</b>	ECTS	6
	Hours (L + E + S)	75 (55 L + 10 E + 10 S)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	Familiarize participants with the most advanced transportation systems used in fruit production, viticulture, and winemaking, emphasizing the potential for more rational use of these systems, preservation of soil fertility, and environmental protection.	
<b>Course enrolment requirements</b>	No prerequisites	
<b>Intended course learning outcomes</b>		
Upon successfully completing the module, students will be able to:		
<ol style="list-style-type: none"> <li>1. Describe the physical and mechanical characteristics of transported materials.</li> <li>2. Select the optimal type of transport packaging and warehouse design according to the quantity and type of produced goods.</li> <li>3. Explain the working principles of transport equipment in fruit production, viticulture, and winemaking processes.</li> <li>4. Develop algorithms for transport systems and optimize their performance.</li> <li>5. Prepare and present a specific topic related to transport systems in winemaking production.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
Eligibility to take the final exam is granted upon achieving a minimum number of assessment points. Assessment points are earned through attendance (minimum 70%), participation in class activities, and scores from partial exams. During the semester, students take two partial exams (in the 7th and 13th weeks of classes). Additionally, students are required to prepare and defend one seminar paper in the 14th week of classes. The final exam is mandatory, and a passing grade in the final exam is a prerequisite for a positive overall grade. The final exam can be oral or written.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Babić, Ljiljana, Babić, M.: Sušenje i skladištenje, Poljoprivredni fakultet u Novom Sadu, Novi Sad, 2000.</li> <li>2. Brkić, D., Vujčić, M., Šumanovac, L., Lukač, P., Kiš, D., Jurić, T., Knežević, D.: Eksploatacija poljoprivrednih strojeva, Poljoprivredni fakultet u Osijeku, 2005. Georgijević, M.: Regalna skladišta, Fakultet tehničkih nauka u Novom Sadu, Novi Sad, 1995.</li> <li>3. Lukač, P., Pandurović, T.: Strojevi za berbu voća i grožđa, Poljoprivredni fakultet u Osijeku, Osijek, 2011.</li> <li>4. Šumanovac, L., Sebastijanović, S., Kiš, D.: Transport u poljoprivredi, Poljoprivredni fakultet u Osijeku, Osijek, 2011.</li> <li>5. Šumanovac, L.: Transport u poljoprivredi, Poljoprivredni fakultet u Osijeku, Osijek-Vinkovci, 2001</li> <li>6. Znanstveno-stručni radovi objavljeni u referentnim međunarodnim časopisima koji će poslužiti za pripremu seminara</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Brčić, J., i sur.: Mehanizacija rada voćarstva i vinogradarstva, Agronomski fakultet u Zagrebu, Zagreb, 1995.</li> <li>2. Kurth, F.: Grundlagen der Fördertechnik, VEB Technik Verlag, Berlin, 1987.</li> <li>3. Mađarević, B.: Rukovanje materijalom (Unutrašnji transport-Pakiranje-Skladištenje), Tehnička knjiga, Zagreb, 1972.</li> <li>4. Marković, D.: Transport u poljoprivredi, Mašinski fakultet, Beograd, 1997.</li> <li>5. Potkonjak, V., Zoranović, M.: Transportna sredstva u poljoprivredi, Poljoprivredni fakultet u Novom Sadu, Novi Sad, 1993.</li> </ol>		

<b>MECHANISMS AND PHYTO-REGULATION METHODS</b>		
<b>Coordinator</b>	Miroslav Lisjak	
<b>Collaborators</b>	Aleksandar Stanisavljević	
<b>Study year and semester</b>	2nd year, 3rd semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	Contact hours (L+P+S)	75 (50 L +20 P + 5 S)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	The aim is to familiarize students with the physiological mechanisms involved in the regulation of growth and development, as well as the practical possibilities for controlling these processes, in plants characteristic of fruit production. Students will also be introduced to techniques of micropropagation and in vitro cultivation. Additionally, they will gain knowledge of postharvest techniques for regulating cellular respiration in order to reduce both quantitative and qualitative losses during storage.	
<b>Course enrolment requirements</b>	No preconditions	
<b>Intended course learning outcomes</b>		
<p>Upon successful completion of the module, students will be able to:</p> <ol style="list-style-type: none"> <li>1. Describe and recognize the significance of mechanisms and methods of phyto-regulation in modern agricultural production.</li> <li>2. Identify and differentiate the specific actions of individual plant hormones, retardants, and other physiologically active substances.</li> <li>3. Analyze the impact of primary and secondary metabolism on fruit quality.</li> <li>4. Implement appropriate phyto-regulation measures based on environmental conditions and plant species.</li> <li>5. Explain micropropagation techniques and in vitro propagation.</li> <li>6. Assess the growth dynamics of fruit crops by monitoring and measuring specific indicators.</li> <li>7. Predict the occurrence of abiotic stress and recognize fruit tree responses to stress, as well as select phyto-regulation measures to prevent or reduce the consequences of stressful environmental conditions.</li> <li>8. Connect acquired knowledge of cellular respiration physiology with the possibilities for regulating respiration under storage conditions.</li> <li>9. Evaluate fruit quality through laboratory analysis of specific indicators.</li> <li>10. Integrate and apply theoretical foundations in practical contexts.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
The evaluation of students' performance is carried out continuously throughout the course activities: attendance and participation in lectures and exercises are monitored, and knowledge is assessed through a final exam. In determining the final grade, the following components are considered: ongoing monitoring of class participation (classroom activity, preparation for lessons, reflective review of course content), practical exercises (classroom activity, preparation for lessons, effectiveness in completing exercises), seminar paper (preparation and presentation), and the final exam.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>2. Pevalsek-Kozlina, B. (2003.): Fiziologija bilja. Profil International. Zagreb.</li> <li>3. Baugher, A. Tara, Singha, S. (2003): Concise encyclopedia of temperate tree fruit, The Haworth Press, Inc., USA.</li> <li>4. Westwood, N. M. (1993): Temperate-zone pomology. Physiology and culture, 3rd edition. Timber press, INC, Portland, Oregon USA.</li> <li>5. Jackson, J. E. (2003): Biology of apples and pears, Cambridge University Press, UK.</li> <li>6. Miljković, I. (2013): Primjena biljnih regulatora rasta u uzgoju jabuka. Poljoprivredni institut, Osijek.</li> <li>7. Miljković, I. (2013): Intenzivna sadnja jabuka uzgojni oblici, poljoprivredni institut, Osijek.</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>5. Knee, M. (2002): Fruit quality and its biological basis. Sheffield Academic Press, UK</li> <li>6. Hodges, D. M. (2003): Postharvest oxidative stress in horticultural crops, The Haworth Press, Inc., USA</li> </ol>		



<b>MECHANISMS OF AGRICULTURAL MACHINES</b>		
<b>Coordinator</b>	Goran Heffer	
<b>Collaborators</b>	Ivan Vidaković Goran Pačarek	
<b>Study year and semester</b>	2nd year, 3rd semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	Contact hours (L+P+S)	75 (45 L +300 P)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	The goal is to familiarize students with the methods of structural, kinematic, and dynamic analysis of mechanisms, as well as the theory of machines. Through practical examples in exercises and programming tasks, students will apply the acquired knowledge to solve characteristic mechanisms found in agricultural machinery.	
<b>Course enrolment requirements</b>	Engineering mechanics II	
<b>Intended course learning outcomes</b>		
Upon successful completion of the module, students will be able to:		
<ol style="list-style-type: none"> <li>1. Identify and interpret types of kinematic pairs. Explain the degrees of freedom of motion in kinematic chains and mechanisms.</li> <li>2. Analyze the motion of planar mechanisms. Determine the velocities and accelerations of characteristic points in agricultural machine mechanisms using analytical and graphical methods.</li> <li>3. Identify, interpret, and differentiate types of forces and force transmissions (active, reactive, inertial) in agricultural machine mechanisms.</li> <li>4. Perform a kinemostatic analysis of simpler mechanisms in agricultural machinery.</li> <li>5. Conduct a dynamic analysis of agricultural machinery mechanisms.</li> <li>6. Identify and explain the balancing of mechanisms and machine rotors.</li> <li>7. Identify and interpret curved, gear, and screw mechanisms, as well as Cardano-Hooke joints, and their applications in agricultural machines.</li> <li>8. Explain the structural, kinematic, and kinemostatic analysis of the suspension and support mechanisms of tractors.</li> <li>9. Explain the kinematics and dynamics of robotic arms and manipulators.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
The evaluation of students will include attendance and participation in lectures and exercises, one programming task, two partial exams, and one final written exam. In addition to the 75 hours spent in class, students are required to dedicate a minimum of 75 hours for studying the material and completing the programming task. Throughout the semester, students must regularly attend classes, properly complete and submit the programming task, take the two partial knowledge assessments (exams), and take the final exam.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Muftić, O, Drača, K.: Uvod u teoriju mehanizama, Fakultet strojarstva i brodogradnje, Zagreb, 1994.</li> <li>2. M. Vujčić: Inženjerske mehanika II, Poljoprivredni fakultet Osijek 2012/2013. (interna skripta)</li> <li>3. M. Vujčić, M. Bilandžić, T. Novaković, I. Menđušić: Robotika i njena primjena u poljoprivredi, Zbornik radova XI. Savjetovanja mehanizatora Slavonije i Baranje, Vinkovci, 1987., str. 113-127.</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Sapunar, Z. (1972).: Mehanizmi, Sveučilište u Zagrebu, Rijeka</li> <li>2. Sapunar, Z. (1982).: Mehanizmi, pretisak iz Tehničke enciklopedije 8, JLZ Miroslav Krleža, Zagreb</li> <li>3. Šurina, T, Crneković, M (1990): Industrijski roboti, Školska knjiga, Zagreb</li> <li>4. Myszka, D. H (2004): Machines and Mechanisms, Prentice Hall, Upper Saddle River, NJ.</li> </ol>		

<b>METHODS AND PLANS OF ANIMAL SELECTION</b>		
<b>Coordinator</b>	Boris Lukić	
<b>Collaborators</b>	Nikola Raguž	
<b>Study year and semester</b>	2nd year, 3rd semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	Contact hours (L+P+S)	75 (45 L +30 P)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	The aim is to familiarize students with the importance of animal breeding, breeding methods and plans, quantitative genetics and genomics, and their application in breeding programs for domestic animals.	
<b>Course enrolment requirements</b>	No preconditions	
<b>Intended course learning outcomes</b>		
<p>Upon successful completion of the module, students will be able to:</p> <ol style="list-style-type: none"> <li>1. Explain the concept of breeding plans and methods used in the selection of domestic animals.</li> <li>2. Analyze quantitative traits using pedigree and genomic information.</li> <li>3. Apply modern knowledge and insights to enhance the breeding of domestic animals and improve breeding programs.</li> <li>4. Develop a breeding program for modern breeds intended for intensive production, as well as for endangered breeds aimed at extensive and sustainable breeding.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
Students are expected to attend classes regularly and actively participate in solving tasks during lectures and exercises. After the lectures and exercises, students will take a written exam, and upon passing the written exam, they will proceed to an oral exam. Students are encouraged to take notes during lectures and exercises and to prepare for the exam using the required literature. During the lectures, PowerPoint and Prezi presentations will be used as aids to explain the content being discussed.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Kor Oldenbroek and Liesbeth van der Waaij, 2015. Textbook Animal Breeding and Genetics for BSc students. Centre for Genetic Resources The Netherlands and Animal Breeding and Genomics Centre, 2015.</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Falconer, D.S., Mackay, T.F. Introduction to Quantitative Genetics. Longman Group; Ltd, 1996.</li> <li>2. Van Vleck, L. Dale. Selection index and introduction to mixed model methods. CRC Press. 1999.</li> </ol>		

<b>SOIL MICROBIOLOGY</b>		
<b>Coordinator</b>	Gabriella Kanižai Šarić	
<b>Collaborators</b>	-	
<b>Study year and semester</b>	2nd year, 3rd semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	Contact hours (L+P+S)	75 (40 L +20 P + 15 S)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	The goal is to familiarize graduate students with the soil microbial population and all the processes involved, as well as their direct and irreplaceable role in the cultivation of vegetables and flowers.	
<b>Course enrolment requirements</b>	No preconditions	
<b>Intended course learning outcomes</b>		
<p>Upon successful completion of the module, students will be able to:</p> <ol style="list-style-type: none"> <li>1. Differentiate and describe soil microorganisms.</li> <li>2. Explain the interactions among microorganisms and distinguish between categories of microbial relationships.</li> <li>3. Understand microbial metabolism and the potential applications of specific metabolic processes in agricultural production.</li> <li>4. Explain the significance and role of beneficial microorganisms in the cultivation of vegetables and flowers.</li> <li>5. Propose the use of beneficial microorganisms in the fertilization and protection of vegetables and flowers.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
<p>The right to take the final exam is granted by earning a minimum number of assessment points. Assessment points are earned based on class attendance (minimum 70%), participation in lectures and exercises, writing and presenting a seminar, and scores from partial exams. During the semester, students will take two partial exams. The final exam is mandatory, and a positive 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. Đukić, D.A., Jemcev, V.T., Kuzmanova, J. (2007): Biotehnologija zemljišta. Univerzitet u Kragujevcu, Agronomski fakultet u Čačku.</li> <li>2. Lalević B., Hamidović S., Komlen V. (2020): Građa i funkcija mikroorganizama u agroekosistemu. Agromedicinski fakultet Univerziteta Džemal Bijedić u Mostaru</li> <li>3. Subba Rao, N.S. (1999): Soil Microbiology, Science Pub Inc., SAD.</li> <li>4. Valpuesta, V. (ur.) (2002): Fruit and Vegetable Biotechnology. Woodhead Publishing Limited, Cambridge.</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Rai, M.K. (ur.) (2005): Handbook Of Microbial Biofertilizers. Haworth Press, New York</li> </ol>		

<b>MONITORING AND ENVIRONMENT PROTECTION</b>		
<b>Coordinator</b>	Irena Jug	
<b>Collaborators</b>	Vesna Vukadinović Boris Đurđević	
<b>Study year and semester</b>	2nd year, 3rd semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	Contact hours (L+P+S)	75 (60 L + 15 S)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	The goal is to familiarize participants with global environmental pollutants and the strategy for sustainable economic development. The focus is on the impact of agriculture on the environment, risk reduction measures, and the role of monitoring in sustainability systems.	
<b>Course enrolment requirements</b>	No preconditions	
<b>Intended course learning outcomes</b>		
<p>Upon successful completion of the module, students will be able to:</p> <ol style="list-style-type: none"> <li>1. Explain the concept and importance of sustainable agriculture and the impact of intensive agriculture on the environment.</li> <li>2. Compare the environmental consequences of conventional and sustainable agricultural production.</li> <li>3. Discuss the application of mineral and organic fertilizers in terms of soil pollution and plant nutrient needs.</li> <li>4. Explain the impact of agrochemicals on the environment.</li> <li>5. Describe the significance of monitoring for rational agricultural land management.</li> <li>6. Use GIS tools to visualize soil and agrochemical data.</li> <li>7. Apply legal regulations in the field of environmental protection.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
Pravo izlaska na završni ispit ostvaruje se prikupljanjem minimalnog broja ocjenskih bodova. Ocjenski bodovi ostvaruju se na temelju pohađanja nastave (minimalno 70 % ), aktivnosti na nastavi, ocjenama iz seminarskih radova i ocjenama iz parcijalnih ispita. Tijekom semestra, studenti polažu tri parcijalna ispita (u 5., 9. i 13. tjednu nastave). Završni ispit je obavezan, a pozitivna ocjena iz završnog ispita je preduvjet pozitivne konačne ocjene. Završni ispit je usmeni.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Springer, O.P., Springer, D. (2008): <i>Otrovani modrozeleni planet. Priručnik iz ekologije, ekotoksikologije i zaštite prirode i okoliša.</i> Meridijani. Samobor.</li> <li>2. Jug I., Jug D., Brozović B., Vukadinović V., Đurđević B. (2022): <i>Osnove tloznanstva i biljne proizvodnje.</i> Sveučilišni udžbenik. Sveučilište Josipa Jurja Strossmayera u Osijeku, Fakultet agrobiotehničkih znanosti Osijek (FAZOS), Osijek, Hrvatska, str. 527. ISBN: 978-953-8421-00-6.</li> <li>3. Kisić, I. (2012): <i>Sanacija onečišćenog tla</i>, Udžbenik sveučilišta u Zagrebu</li> <li>4. Jurišić M., Plaščak I. (2009): <i>Geoinformacijski sustavi GIS u poljoprivredi i zaštiti okoliša</i>, Udžbenik, Poljoprivredni fakultet Osijek</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Jug D., Jug I., Vukadinović V., Đurđević B., Stipešević B., Brozović B. (2017): <i>Konzervacijska obrada tla kao mjera ublažavanja klimatskih promjena.</i> Sveučilišni priručnik. Hrvatsko društvo za proučavanje obrade tala (HD POT), Osijek, Hrvatska, str. 176. ISBN: 978-953-7871-61-1.</li> <li>2. Láng, I., M. Jolánkai, T. Komives (2004): <i>Pollution Processes in Agri-Environment</i>, pp. 277. Akaprint Publishers, Budapest</li> </ol>		

<b>MILKING AND MILKING DEVICES</b>		
<b>Coordinator</b>	Davor Kralik	
<b>Collaborators</b>	Marcela Šperanda	
<b>Study year and semester</b>	2nd year, 3rd semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	Contact hours (L+P+S)	75 (45 L + 20 P + 10S)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	The goal is to familiarize students with the basics of milk production, with an emphasis on the latest advancements in milking processes and milking equipment.	
<b>Course enrolment requirements</b>	No preconditions	
<b>Intended course learning outcomes</b>		
<p>Upon successful completion of the module, students will be able to:</p> <ol style="list-style-type: none"> <li>1. Describe the anatomy and physiology of the udder, the milk production process, and the role of hormones in secretion and milking.</li> <li>2. Describe the milking process.</li> <li>3. Define the technical systems involved in milking.</li> <li>4. Describe the components and the role of individual parts of milking equipment.</li> <li>5. Identify errors and irregularities in the milking process.</li> <li>6. Describe the processes of automation and robotization in milking.</li> <li>7. Describe the milk cooling system.</li> <li>8. Define the components of maintenance for technical systems in milking.</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 lectures. In the second part of the semester, a visit to a dairy farm will be organized, where students will observe the milking process and various milking systems. Attendance at the field trip is mandatory. Continuous knowledge assessment will be conducted through partial exams and a seminar paper, as well as a final written exam. Attendance at partial exams is not mandatory. Final exam is mandatory.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Alen Džidić (2013.) Laktacija i strojna mužnja</li> <li>2. Matija Domaćinović i sur. (2009.) Proizvodnja mlijeka</li> <li>3. Jasmina Havranek i sur. (2003.) Mlijeko - od farme do mljekare</li> <li>4. Ivan Bogut i sur. (2001.) Anatomija i fiziologija domaćih životinja</li> <li>5. Rudolf Emert i sur. (1997.) Popravak poljoprivrednih strojeva</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Horst Eichhorn (1985): Landtechnik, Stuttgart</li> <li>2. Jozef Lobetka (1980): Tehnika a mechanizácia živočišnej výroby</li> <li>3. Hall et al. (1977) Machine MilkingWienHorst Eichhorn (1985): Landtechnik, Stuttgart</li> <li>4. Petar Kulišić (1991): Novi izvori energije, Školska knjiga Zagreb</li> </ol>		

<b>NEMATOTOLOGY</b>		
<b>Coordinator</b>	Mirjana Brmež	
<b>Collaborators</b>	Josipa Puškarić	
<b>Study year and semester</b>	2nd year, 3rd semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	Contact hours (L+P+S)	75 (50 L + 25 P)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	The goal is to familiarize students with the importance of nematodes in nature, the issues related to plant parasitic nematodes, zoophagous nematodes, and beneficial nematodes.	
<b>Course enrolment requirements</b>	No preconditions	
<b>Intended course learning outcomes</b>		
<p>Upon successful completion of the module, students will be able to:</p> <ol style="list-style-type: none"> <li>1. Properly collect soil samples for nematological analysis, process them correctly, extract nematodes, count them, and determine whether they are plant parasites or not.</li> <li>2. Describe the biology of nematodes, their life cycle, and their importance in nature.</li> <li>3. Recognize the most important plant-parasitic nematodes, as well as the symptoms observed in the field and on plants resulting from attacks by these nematodes.</li> <li>4. Describe nematodes associated with roots, stems, leaves, and seeds.</li> <li>5. Recommend a control plan for plant-parasitic nematodes.</li> <li>6. Explain the role of nematodes in nature and the importance of using nematodes as bioindicators.</li> <li>7. Select the most suitable entomopathogenic nematodes for the control of harmful insects.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
In determining the final grade for students, the following components are considered: continuous monitoring of attendance and participation in lectures and exercises (classroom activity, preparation for lessons, and reflective review of course content), as well as partial knowledge assessments or the final exam. Final exam is mandatory.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Ivezić, M. (2014): Fitonematologija. Grafika do.o.o. Osijek, p.p. 109.</li> <li>2. Ljerka Oštrec (1998): Zoologija. Zrinski Čakovec (knjiga) za tematske cjeline: p.p. 232.</li> <li>3. Krnjajić, Đ., Krnjajić, S: (1987): Fitonematologija. Nolit, Beograd. p.p. 433.</li> <li>4. Bongers, T.(1994): De nematoden van Nederland. KNNV: Utrecht.</li> <li>5. Southey, J.F. (1970): Laboratory methodes for work with plant and soil nematodes. London (praktikum).</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Scientific and professional papers in the field of nematology.</li> </ol>		

<b>FACILITIES AND VENTILATION SYSTEMS IN ANIMAL PRODUCTION</b>		
<b>Coordinator</b>	Davor Kralik	
<b>Collaborators</b>	Boris Antunović	
<b>Study year and semester</b>	2nd year, 3rd semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	Contact hours (L+P+S)	75 (45 L + 20 P + 10 S)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	The goal is to familiarize students with the types of facilities for housing and breeding animals, as well as the materials used in the construction of livestock buildings. Additionally, students will be introduced to ventilation systems designed to ensure zoo-climatic conditions in animal housing.	
<b>Course enrolment requirements</b>	No preconditions	
<b>Intended course learning outcomes</b>		
Upon successful completion of the module, students will be able to: <ol style="list-style-type: none"> <li>1. Perform technological design of a farm.</li> <li>2. Calculate housing capacity based on the type and category of animals, purpose, and production method.</li> <li>3. Calculate heat losses in livestock buildings and determine ventilation requirements.</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 lectures. In the second part of the semester, a field visit to farms will be organized to gain practical knowledge. Attendance at the field trip is mandatory. Continuous knowledge assessment will take place through partial exams and a seminar paper, as well as a final written exam. Attendance at partial exams is not mandatory. Final exam is mandatory.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Gordana Kralik (2011.) Zootehnika</li> <li>2. Gordana Kralik (2009.) Peradarstvo - biološki i zootehnički principi</li> <li>3. Gordana Kralik (2007.) Svinjogojstvo - biološki i zootehnički principi</li> <li>4. Senčić, Đ., Pavičić Ž., Bukvić Ž.(1996): Intenzivno svinjogojstvo, Osijek</li> <li>5. Biglbauer, M.(1997): Poljoprivredni objekti, Osijek</li> <li>6. Šikić, D. (1980): Elementi projektiranja građevinskih firmi. Poljoprivredno graditeljstvo, Zagreb</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Maton, A., Daelemans J., Lambrecht J.(1989): Housing of Animals, Oxford – New York</li> <li>2. Kavgić, P.(1999): Energetski autonomno i ekološki čista farma, Zagreb</li> </ol>		

<b>RENEWABLE ENERGY RESOURCES IN AGRICULTURE</b>		
<b>Coordinator</b>	Davor Kralik	
<b>Collaborators</b>	Đurđica Kovačić	
<b>Study year and semester</b>	2nd year, 3rd semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	Contact hours (L+P+S)	75 (45 L + 20 P + 10 S)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	The aim is to familiarize graduate students with various sources of renewable energy derived from agricultural production. This includes methods of production and application of renewable energy sources (RES) in agricultural practices.	
<b>Course enrolment requirements</b>	No preconditions	
<b>Intended course learning outcomes</b>		
<p>Upon successful completion of the module, the student will be able to:</p> <ol style="list-style-type: none"> <li>1. Define the legal regulations of the Republic of Croatia (RH) and the European Union (EU) regarding renewable energy sources (RES).</li> <li>2. Define biomass sources and the methods of converting them into energy.</li> <li>3. Describe the properties of biogas, the process of anaerobic fermentation of biomass in biogas production.</li> <li>4. Define facilities for biogas production.</li> <li>5. Describe biodiesel and its properties, the technology for biodiesel production, and the potential uses of biodiesel in agriculture.</li> <li>6. Dimension various facilities for the production of RES.</li> <li>7. Calculate the energy potential of raw materials for RES production.</li> <li>8. Describe the environmental impact of RES.</li> <li>9. Technologically design the production and use of RES in agricultural production.</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 lectures. In the second part of the semester, visits to biogas plants, biomass power plants, and solar power plants will be organized to acquire practical knowledge. Attendance at field trips is mandatory. Continuous assessment of knowledge will be conducted through partial exams and a seminar paper, culminating in a final written exam.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Gordana Kralik (2011.) Zootehnika</li> <li>2. Labudović i sur. (2012.) Osnove primjene biomase</li> <li>3. Labudović i sur. (2011.)1 Fotonaponski sustavi</li> <li>4. Labudović i sur. (2011.)2 Solarni toplinski sustavi</li> <li>5. Ljubomir Majdandžić (2010.) Solarni sustavi</li> <li>6. Boris Labudović i sur. (2009. ) Dizalice topline</li> <li>7. Ljubomir Majdandžić (2008.) Obnovljivi izvori energije</li> <li>8. Gordana Kralik (2007.) Svinjogojstvo - biološki i zootehnički principi</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Baličević, I., i sur. (2001.): Agrar energija i ekologija,</li> <li>2. Graf, W. (1994.): Biogas- Historisches, Biogas für Österreich, Gefördert vom Bundesministerium für Umwelt, Jugend und Familie,</li> <li>3. Đulbić, M. (1986.): Biogas, dobijanje, korištenje i gradnja uređaja, Beograd,</li> <li>4. WienHorst Eichhorn (1985): Landtechnik, Stuttgart</li> <li>5. Petar Kulišić (1991): Novi izvori energije, Školska knjiga Zagreb</li> <li>6. BIOEN (2001): Projekt biodizel – uvođenje proizvodnje biodizelskoga goriva u RH, Energetski institut "Hrvoje Požar" Zagreb</li> </ol>		



<b>PRESERVATION OF ANIMAL GENETIC RESOURCES</b>		
<b>Coordinator</b>	Nikola Raguž	
<b>Collaborators</b>	Vladimir Margeta Pero Mijić Zlata Kralik Mirjana Baban Zvonko Antunović Josip Novoselec Boris Lukić	
<b>Study year and semester</b>	2nd year, 3rd semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	Contact hours (L+P+S)	75 (65 L + 10 S)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	Introducing students to the concept of biodiversity, the importance of animal genetic diversity in the context of global and national strategies, with a particular focus on the status and methods of protecting endangered breeds and species of domestic animals.	
<b>Course enrolment requirements</b>	No preconditions	
<b>Intended course learning outcomes</b>		
<p>Upon successful completion of the module, the student will be able to:</p> <ol style="list-style-type: none"> <li>1. Understand the main objectives of studying and conserving animal genetic diversity.</li> <li>2. Interpret the importance and role of indigenous populations of domestic animals in the conservation of animal genetic diversity.</li> <li>3. Recognize the significance of effective population size in determining the degree of endangerment of breeds and species in a given area and understand the impact of inbreeding.</li> <li>4. Recognize the importance of studying the genetic structure of indigenous breeds.</li> <li>5. Differentiate between molecular methods and procedures used in studying the genomes of indigenous breeds.</li> <li>6. Independently present and critically evaluate models for the protection and conservation of indigenous and endangered breeds and species of domestic animals.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
<p>The right to take the final exam is earned by accumulating a minimum number of assessment points. These points are obtained through class attendance (minimum 70%), active participation in class, and grades from partial exams. During the semester, students will take three partial exams (in the 4th, 8th, and 15th weeks of instruction). The final exam is mandatory, and a passing grade on the final exam is a prerequisite for obtaining a positive final grade. The final exam is oral.</p>		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. FAO: The State of the World's Animal genetic Resources for Food and Agriculture – in brief, edited by Dafyd Piling and Barbara Rischowsky. Rome, 2007.</li> <li>2. Nacionalni program očuvanja i zaštite ugroženih pasmina i vrsta (Ministarstvo poljoprivrede, šumarstva i vodnog gospodarstva, 2010)</li> <li>3. Grupa autora: Zelena knjiga izvornih pasmina Hrvatske (Državni zavod za zaštitu prirode u suradnji s Ministarstvom zaštite okoliša i prirode i Hrvatske poljoprivredne agencije), Zagreb, 2011.</li> <li>4. Posavi, M., Ernoić, M., Ozimec, R., Poljak, F.: Hrvatske pasmine domaćih životinja. Ministarstvo zaštite okoliša i prostornog uređenja, Zagreb 2002.</li> </ol>		
<b>Additional literature</b>		

1. Baumung, R., Simianer, H., Hofman, I. Genetic diversity studies in farm animals – a survey. *J. Anim. Breed. Genet.* 121 (2004), 363-373.
2. Caput, P., Ivanković, A.: Tipizacija genoma domaćih životinja u Hrvatskoj. Zbornik radova sa znanstvenog skupa pod naslovom: Biodiversity in livestock products in Croatia, Zagreb, 2007, str. 29-38.
3. Ostali stručni i znanstveni radovi prezentirani i objavljeni u časopisima i zbornicima s konferencija o zaštiti i očuvanju ugroženih pasmina i vrsta kod nas i u svijetu.

<b>SUSTAINABLE TECHNOLOGIES OF PLANT BREEDING</b>		
<b>Coordinator</b>	Mladen Jurišić	
<b>Collaborators</b>	Irena Rapčan	
<b>Study year and semester</b>	2nd year, 3rd semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	Contact hours (L+P+S)	75 (60 L + 15 P)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	The goal is to familiarize students with the key technological factors in the sustainable cultivation of crops (both field and vegetable crops) and to train them to independently utilize all available scientific and professional advancements in crop production, with a focus on sustainable agriculture as a global trend. Furthermore, students will be introduced to the development and use of expert systems in crop production, as well as contemporary trends in long-term management, integrated farming, biodynamic farming, and organic farming methods.	
<b>Course enrolment requirements</b>	No preconditions	
<b>Intended course learning outcomes</b>		
Upon successful completion of the module, the student will be able to:		
<ol style="list-style-type: none"> <li>1. Describe the general and economic significance of sustainable crop production. Identify and explain the agro-ecological factors influencing crop cultivation (the requirements of specific crops with regard to climatic conditions and soil).</li> <li>2. Identify, describe, and interpret current trends in sustainable crop production, particularly Integrated, Biodynamic, and Organic farming methods.</li> <li>3. Describe the importance of agro-climatic factors affecting plant growth and development. Identify and explain sustainable technologies for cereal crop cultivation, incorporating the use of the AgBase database within an expert system framework.</li> <li>4. Interpret sustainable agronomic practices (crop rotation, sowing, soil cultivation for specific crops, farming systems, fertilization, plant protection against diseases, pests, and weeds), as well as the harvesting/collection of industrial and forage crops, and explore alternative cultivation methods using expert systems.</li> <li>5. Interpret sustainable agronomic practices (crop rotation, sowing, soil cultivation for specific crops, farming systems, fertilization, plant protection against diseases, pests, and weeds), as well as the harvesting/collection of key vegetable crops, and explore alternative cultivation methods using expert systems.</li> <li>6. Interpret and present an expert system in crop production and participate in the development of a database for plant production, with potential applications for creating thematic maps in crop production.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
The right to take the final exam is earned by accumulating a minimum number of assessment points. These points are obtained based on class attendance (minimum 70%), participation in class activities, and grades from partial exams. During the semester, students will take partial exams. 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. Jurišić M. (2009): AgBase – Priručnik za uzgoj bilja, I. Tehnologija (agrotehnika) važnijih ratarskih kultura, MPŠVG RH - VIP projekt VII-5-16/07, Poljoprivredni fakultete, Osijek.</li> <li>2. Jurišić M. (2009): AgBase – Priručnik za uzgoj bilja, II. Tehnologija (agrotehnika) važnijih povrćarskih kultura, MPŠVG RH - VIP projekt VII-5-16/07, Poljoprivredni fakultete, Osijek.</li> <li>3. Jurišić M. (2015): AgBase – Priručnik za uzgoj bilja IV. Opća načela i agrotehnika (tehnologija) organskog uzgoja bilja – povrća, Poljoprivredni fakultet Osijek.</li> <li>4. Rapčan Irena (2014): Priručnik za modul Bilinogojstvo, preddiplomski sveučilišni i stručni studij Mehanizacija, Poljoprivredni fakultet Osijek.</li> </ol>		
<b>Additional literature</b>		

1. Lešić Ružica, Borošić J., Buturac I., Herak-Ćustić Mirjana, Poljak M., Romić D. (2004): Povrćarstvo, Zrinski d. d.
2. Todorović J., Lazić B., Komljenović I. (2003): Ratarsko – povrtarski priručnik, Laktaši, 2003.
3. Lazić Branka, Ilić Z., Đurovka M. (2013) Organska proizvodnja povrća, Centar za organsku proizvodnju, Selenča – Novi Sad.

<b>SUSTAINABLE RURAL DEVELOPMENT</b>		
<b>Coordinator</b>	Tihana Sudarić	
<b>Collaborators</b>	Jadranka Deže Krunoslav Zmaić Lucija Bencarić	
<b>Study year and semester</b>	2nd year, 3rd semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	Contact hours (L+P+S)	75 (60 L + 15 S)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	Contemporary trends in the market environment require the adaptation of rural areas, where family farms dominate—forming the foundation of tradition, culture, and agricultural values. The goal is to adjust farm operations and meet market demands in a way that economically, culturally, and socially recognizes their competitiveness.	
<b>Course enrolment requirements</b>	No preconditions	
<b>Intended course learning outcomes</b>		
<p>Nakon uspješno završenog modula student će moći:</p> <ol style="list-style-type: none"> <li>1. Poznavati temeljne odrednice održivog razvoja</li> <li>2. Objasniti interne i eksterne uvjete okruženja u ruralnom prostoru</li> <li>3. Poznavati diverzifikaciju gospodarskih aktivnosti u ruralnom prostoru</li> <li>4. Identificirati specifičnosti ruralne kulture i tradicije</li> <li>5. Analizirati različite oblike umrežavanja kroz poslovna povezivanja</li> </ol> <p>Poznavati mjere institucijske potpore u ruralnom prostoru</p>		
<b>Assessment and evaluation of student work during classes</b>		
<p>The right to take the final exam is earned by accumulating a minimum number of assessment points. These points are obtained based on class attendance (minimum 70%), participation in class activities, and grades from partial exams and the seminar. During the semester, students will take two partial exams. The final exam is mandatory, and a passing grade on the final exam is a prerequisite for a positive final grade.</p> <p>Students will present their seminar papers orally, with a duration of 10 to 15 minutes, using a PowerPoint presentation.</p>		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Kordej De Villa, Ž., Stubbs, P., Sumpor, M.: Participativno upravljanje za ruralni razvoj, Ekonomski institut, Zagreb 2009.</li> <li>2. Cifrić, I: Ruralni razvoj i modernizacija: Biblioteka znanost i društvo Zagreb 2003. (udžbenik)</li> <li>3. Cifrić, I: Okoliš i održivi razvoj, Biblioteka razvoj i okoliš, Zagreb 2002 (udžbenik)</li> <li>4. Cifrić, I., Čaldarović, O., Kadanj, R., Kufirin, K: Društveni razvoj i ekološka modernizacija, Biblioteka razvoj i okoliš, Zagreb 1998. (udžbenik)</li> <li>5. Program ruralnog razvoja Republike Hrvatske 2014-2020, www.mps.hr</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. AO EU Accession Workshop (2001): The challenge of rural development in the EU accession countries. Washington, D.C.: The World Bank, cop. 2001, 205 pp (radovi)</li> <li>2. Economic development on the local and regional level: initiatives in South-East Europe, Zagreb: Friedrich Ebert Stiftung, proceedings, 84 pp (radovi)</li> <li>3. Kiš, D., Kalambura, S., Jovičić, N., Racz, A., Brdarić, D. (2021): Održivi razvoj - odabrani pojmovi, Fakultet agrobiotehničkih znanosti Osijek, Sveučilište Josipa Jurja Strossmayera u Osijeku</li> <li>4. Tijekom izvođenja nastave odredit će se najnoviji radovi objavljeni u referentnim međunarodnim časopisima koji će služiti za pripremu seminara (radovi)</li> </ol>		

<b>SUSTAINABLE SOIL MANAGEMENT</b>		
<b>Coordinator</b>	Irena Jug	
<b>Collaborators</b>	Danijel Jug Vesna Vukadinović Boris Đurđević	
<b>Study year and semester</b>	2nd year, 3rd semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	Contact hours (L+P+S)	75 (75 L)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	The goal is to introduce students to the role, characteristics, and principles of sustainable soil management in agriculture, focusing on enhancing soil productivity, protecting soil as a natural resource, and minimizing negative environmental impacts. Additionally, students will be familiarized with the importance of a multidisciplinary approach in sustainable agricultural production.	
<b>Course enrolment requirements</b>	No preconditions	
<b>Intended course learning outcomes</b>		
<p>Upon successful completion of the module, the student will be able to:</p> <ol style="list-style-type: none"> <li>1. Explain the concept and importance of sustainable agriculture, the impact of intensive agriculture on the environment, and the principles of sustainable agriculture.</li> <li>2. Describe soil as the foundation of sustainable management, considering it as a conditionally renewable natural resource.</li> <li>3. Explain the role of soil in organic matter formation, soil functions, degradation processes, and the protection of agricultural soils.</li> <li>4. Assess the impact of soil properties on crop yields.</li> <li>5. Select measures for improving the physical, chemical, and biological soil complexes.</li> <li>6. Identify the principles of fertilization and fertilization modeling.</li> <li>7. Recognize the importance of modern soil fertility control.</li> <li>8. Interpret the suitability of the most prevalent soil types for specific land uses within sustainable agricultural production.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
The right to take the final exam is earned by accumulating a minimum number of assessment points. These points are obtained based on class attendance (minimum 70%), participation in class activities, and grades from partial exams. During the semester, students will take four partial exams (in the 7th, 9th, 12th, and 15th weeks of instruction). 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. Jug I., Jug D., Brozović B., Vukadinović V., Đurđević B. (2022): Osnove tloznanstva i biljne proizvodnje. Sveučilišni udžbenik. Sveučilište Josipa Jurja Strossmayera u Osijeku, Fakultet agrobiotehničkih znanosti Osijek (FAZOS), Osijek, Hrvatska, str. 527. ISBN: 978-953-8421-00-6.</li> <li>2. Jug D., Birkás M., Kisić I. (2015): Obrada tla u agroekološkim okvirima. Sveučilišni udžbenik. Hrvatsko društvo za proučavanje obrade tala (HDPOT), Osijek, Hrvatska, str. 275. ISBN: 978-953-7871-48-2.</li> <li>3. Špoljar, A. (2019): Konzervacija i remedijacija tla. Visoko gospodarsko učilište u Križevcima</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Jug D., Jug I., Vukadinović V., Đurđević B., Stipešević B., Brozović B. (2017): Konzervacijska obrada tla kao mjera ublažavanja klimatskih promjena. Sveučilišni priručnik. Hrvatsko društvo za proučavanje obrade tala (HDPOT), Osijek, Hrvatska, str. 176. ISBN: 978-953-7871-61-1.</li> <li>2. Magdoff, F. i Van Es, H. (2009): Building soils for better crops: Sustainable soil management. Sustainable Agriculture Research &amp; Education, third edition.</li> <li>3. Kisić, I. (2016): Antropogena erozija tla, Udžbenik Sveučilišta u Zagrebu</li> </ol>		

<b>BREEDING OF INDUSTRIAL PLANTS</b>		
<b>Coordinator</b>	Mirta Rastija	
<b>Collaborators</b>	Manda Antunović	
<b>Study year and semester</b>	2nd year, 3rd semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	Contact hours (L+P+S)	75 (50 L + 20 P + 5 S)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	The aim is to introduce graduate students to the basic objectives and directions in the selection of industrial crops, classical methods of breeding industrial plants, and the potential for combining classical breeding techniques with biotechnological methods.	
<b>Course enrolment requirements</b>	No preconditions	
<b>Intended course learning outcomes</b>		
<p>Upon successful completion of the module, the student will be able to:</p> <ol style="list-style-type: none"> <li>1. Define the significance, morphological and biological properties, and the systems of sugar beet, sunflower, and soybean.</li> <li>2. Define the breeding objectives for industrial crops (sugar beet, sunflower, and soybean) based on current demands from producers and processors.</li> <li>3. Describe the breeding methods for sugar beet, sunflower, and soybean.</li> <li>4. Perform the procedure for finding and selecting pollen-sterile plants in sugar beet and sunflower.</li> <li>5. Describe the breeding program and the application of genetic markers in soybean breeding.</li> <li>6. Provide a well-argued and critical commentary on a given topic related to the breeding of industrial crops.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
The right to take the final exam is earned by accumulating a minimum number of assessment points. These points are obtained based on class attendance (minimum 70%), participation in class activities, and grades from seminar papers and partial exams. During the semester, students will take three partial exams (in the 4th, 8th, and 11th weeks of instruction). 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. Martinčić, J., Kozumplik, V. (1996.): Oplemenjivanje bilja. I Teorija i metode, II Ratarske kulture. Sveučilište J. J. Strossmayer u Osijeku, Sveučilište u Zagrebu (udžbenik).</li> <li>2. Vratarić M. i sur. (2004): Suncokret. Poljoprivredni institut Osijek.</li> <li>3. Vratarić M., Sudarić A. (2008): Soja. Poljoprivredni institut Osijek (udžbenik).</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Pospišil, M. (2013.): Ratarstvo II dio - industrijsko bilje, Zrinski d.d., Čakovec</li> </ol>		

<b>FORAGE CROPS BREEDING</b>		
<b>Coordinator</b>	Ranko Gantner	
<b>Collaborators</b>	Gordana Bukvić Goran Herman	
<b>Study year and semester</b>	2nd year, 3rd semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	Contact hours (L+P+S)	75 (40 L + 30 P + 5 S)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	The aim is to teach students the methods and objectives of breeding annual and perennial legumes and grasses.	
<b>Course enrolment requirements</b>	No preconditions	
<b>Intended course learning outcomes</b>		
<p>Upon successful completion of the module, the student will be able to:</p> <ol style="list-style-type: none"> <li>1. Assess current and predict future needs for forage crop traits determined by their genetic basis.</li> <li>2. Set breeding objectives for forage crops in accordance with these needs.</li> <li>3. Select appropriate breeding methods for forage crops.</li> <li>4. Collect a starting collection of genotypes and continuously expand it with elite varieties, old varieties, ecotypes, wild relatives, mutants, and other exotic genotypes.</li> <li>5. Plan the creation of new genetic variability using conventional methods (crossbreeding) and become familiar with unconventional methods (chromosome doubling, dihaploidization, mutation induction, transgenic technology).</li> <li>6. Plan and carry out selection within a breeding population.</li> <li>7. Plan the development of candidate new varieties, including variety types such as population varieties, synthetic varieties, or inbred lines.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
<p>In determining the final grade for students, the following components are taken into account: class participation (preparation for lessons and reflective commentary on the course content), seminar paper, two partial exams, and the final exam. The evaluation of the seminar paper includes clarity, accuracy, and relevance of the information presented, as well as the overall (technical and visual) quality of the presentation. If a student misses more than 30% of the classes, they lose the right to receive a signature for the course.</p>		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Boller, B., Posselt, U. K., Veronesi, F. (2010.): Handbook of Plant Breeding (vol.5) – Fodder Crops and Amenity Grasses. Springer Science+Business Media LLC. New York, USA.</li> <li>2. Martinčić, J., Kozumplik, V. (1996.): Oplemenjivanje bilja. Sveučilište u Zagrebu i Sveučilište u Osijeku, 1996.</li> <li>3. Stjepanović, M., Čupić, T., Gantner, R. (2012.): Grašak. Sveučilišni udžbenik. Sveučilište J. J. Strossmayera u Osijeku, Poljoprivredni fakultet u Osijeku. Osijek, Hrvatska.</li> <li>4. Stjepanović, M., Zimmer, R., Tucak, M., Bukvić, G., Popović, S., Štafa, Z. (2009.): Lucerna. Sveučilišni udžbenik. Sveučilište J. J. Strossmayera u Osijeku, Poljoprivredni fakultet u Osijeku. Osijek, Hrvatska.</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Borojević, S. (1981.): Principi i metode oplemenjivanja bilja. Univerzitet u Novom Sadu. Novi Sad, Srbija.</li> </ol>		



<b>CEREALS BREEDING</b>		
<b>Coordinator</b>	Sunčica Kujundžić	
<b>Collaborators</b>	Sonja Vila	
<b>Study year and semester</b>	2nd year, 3rd semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	Contact hours (L+P+S)	75 (35 L + 10 P + 25 S)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	The aim is to familiarize students with the specific characteristics of different cereal species in terms of breeding (systematics, taxonomy, cytogenetics, germplasm, and modes of reproduction), breeding methods, and breeding objectives for individual cereal species based on their intended use.	
<b>Course enrolment requirements</b>	No preconditions	
<b>Intended course learning outcomes</b>		
<p>Upon successful completion of the module, the student will be able to:</p> <ol style="list-style-type: none"> <li>1. Describe and recognize cereal species (origin, systematics, and taxonomy).</li> <li>2. Explain the specifics of applying breeding methods for individual cereal species.</li> <li>3. Recognize the importance of breeding in field crop production.</li> <li>4. Interpret the breeding objectives for each crop, considering different cultivation and production conditions, and explain the importance of selecting appropriate breeding methods for a given agroecosystem in cereal production.</li> <li>5. Provide a well-argued and critical commentary on a given topic related to cereal breeding.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
<p>In determining the final grade for students, the following components are considered: continuous monitoring of class participation (activity in class, preparation for lessons, and reflective commentary on course content), the seminar paper, and the written exam. The evaluation of the seminar paper includes clarity, accuracy, and relevance of the information presented, as well as the overall (technical and visual) quality of the presentation. Attendance is mandatory in accordance with the Regulations on Studies and Studying at the J. J. Strossmayer University of Osijek.</p>		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Martincic, J., Kozumplik, V. (1996): Oplemenjivanje bilja. Udžbenik. Sveučilište u Osijeku i Sveučilište u Zagrebu, 420 stranica.</li> <li>2. Kozumplik, V., Pejić, I. (2012): Monografija Oplemenjivanje poljoprivrednog bilja u Hrvatskoj. Agronomski fakultet Sveučilišta u Zagrebu.</li> <li>3. Martinčić, J., Marić, S. (1996): Oplemenjivanje bilja. Vježbovnik, Poljoprivredni fakultet u Osijeku</li> </ol> <p>During the course, the most recent papers published in reference international journals will be selected, which will serve as the basis for seminar preparation.</p>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Sleper, D.A. and Poehlman, J.M. (2006): Breeding Field Crops. Iowa State University Press.</li> </ol>		