

Josip Juraj Strossmayer University of Osijek
FACULTY OF AGROBIOTECHNICAL SCIENCES OSIJEK

CURRICULUM

Fruit Growing, Viticulture, and Wine Production
(University Graduate Study Programme)

Major in **FRUIT GROWING**

Academic Year 2022-23

June, 2022

List of Teachers and Courses

Academic year 2022 - 23

Fruit Growing, Viticulture, and Wine Production

(University Graduate Study Programme)

Major in **FRUIT GROWING**

A full-time Study Programme

Fruit Growing, Viticulture, and Wine Production (University Graduate Study Programme)

Major in **FRUIT GROWING**

I. semester								
COORDINATOR	COURSE NAME	TEACHERS ON THE COURSE AND TYPE OF CLASSES						ECTS
		NAME AND SURNAME	LECTURES	SEMINARS	EXERCISES			
					FP	AP	P	
Andrijana Rebekić	Biometrics	Andrijana Rebekić	45			30		6
Vesna Vukadinović	Land Resources Evaluation	Vesna Vukadinović Irena Jug	45 30					6
Đuro Banaj	Mechanization in fruit growing, viticulture and wine production	Đuro Banaj Vjekoslav Tadić Anamarija Banaj	30 32			13		6
Vladimir Jukić	Breeding of fruit trees, vine and seedling production	Vladimir Jukić Aleksandar Stanisavljević Mato Drenjančević Toni Kujundžić Dejan Bošnjak	25 25 10 10			5		6
Ana Crnčan	Economics of Fruits, Grapes and Wine Production	Ana Crnčan Lončarić Ružica Sanja Jelić Milković	30 20		10	15		6
II. semester								
COORDINATOR	COURSE NAME	TEACHERS ON THE COURSE AND TYPE OF CLASSES						ECTS
		NAME AND SURNAME	LECTURES	SEMINARS	EXERCISES			
					FP	AP	P	
Aleksandar Stanisavljević	Fruit growing I	Aleksandar Stanisavljević Dejan Bošnjak	65			10		6
Aleksandar Stanisavljević	Fruit growing II	Aleksandar Stanisavljević Dejan Bošnjak	65			10		6
Aleksandar Stanisavljević	Ecological Fruit Growing	Aleksandar Stanisavljević Dejan Bošnjak	65			10		6
Darko Kiš	Technology of Harvest and Storage	Darko Kiš Zvonimir Zdunić	45 5			5 5	15	6

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BIOMETRICS		
Coordinator	Andrijana Rebecić	
Collaborators		
Study year and semester	First year, I. semester	
Number of credits and mode of delivery	ECTS credits	6
	Number of hours (L+E+S)	75 (45 L + 30 E)
COURSE DESCRIPTION		
Course aims	To present and interpret the basics of scientific theory and scientific conclusion to graduate students through the application of statistical methods and tests.	
Course enrolment requirements	No enrolment requirements	
Intended course learning outcomes		
After successfully completing the course, the student will be able to:		
<ol style="list-style-type: none"> 1. Recognize basic statistical terminology. 2. Identify adequate experimental methods and techniques. 3. Set the research aims and scientific hypothesis. Organize and monitor the experiment, collect the experimental data, determine the sample size, edit the statistical series and group the data. 4. Calculate basic statistical parameters using descriptive statistical methods: measures of central tendency, measures of variation. 5. Properly apply parametric tests, analysis of variance, correlation-regression analysis, test time series. 6. Recognize and apply numerous diagrams as visual tools for presentations of experimental data. 7. Properly select and apply statistical non-parametric methods and analysis. 8. Recognize basics of software for statistical data analysis (Statistica, SAS). 9. Develop statistical (scientific) rethinking based on the results obtained by statistical analysis. 		
Assessment and evaluation of student work during classes		
The right to take the final exam is obtained by accumulating a minimum number of assessment points. Assessment points are earned based on class attendance (at least 70%), 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 passing overall grade. The final exam is oral.		
Obligatory literature		
<ol style="list-style-type: none"> 1. Horvat, D., Ivezić, M. (2005): Biometrika u poljoprivredi. Poljoprivredni fakultet u Osijeku. 2. Vasilj, Đ. (2000): Biometrika i eksperimentiranje u bilinogojstvu. Hrvatsko agronomsko društvo. Zagreb 		
Additional literature		
<ol style="list-style-type: none"> 1. Petz, B. (1985): Osnovne statističke metode za nematematičare. SNL, Zagreb. 2. Hadživuković, S. (1991): Statistički metodi s primenom u poljoprivrednim i biološkim istraživanjima. Poljoprivredni fakultet, Novi Sad 3. Mead, R., Curnow, R. N. and Hasted, A. M. (1993): Statistical Methods in Agriculture and Experimental Biology. Chapman & Hall. 		

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LAND RESOURCES EVALUATION		
Coordinator	Vesna Vukadinović	
Collaborators	Irena Jug	
Study year and semester	First Year, 1st Semester	
Number of credits and mode of delivery	ECTS credits	6
	(L+E+S)	75 (75L)
COURSE DESCRIPTION		
Course aims	The aim of this course is to introduce the methodology for assessing and evaluating the suitability of land resources for permanent crops.	
Course enrolment requirements	None	
Intended course learning outcomes		
<p>Upon successful completion of the module, the student will be able to:</p> <ol style="list-style-type: none"> 1. Identify the morphological properties of soil and collect soil samples in the field. 2. Analyze, interpret, and apply the results of physical and chemical soil analyses in practice. 3. Classify soils according to specified criteria. 4. Create a database for assessing land suitability. 5. Recognize limitations of production areas and propose corrective measures before establishing vineyards or orchards. 6. Define the concept of monitoring, and plan, organize, and implement it on production areas. 7. Compare different methods for assessing land suitability for permanent crops. 8. Recommend fertilization practices for vineyards and orchards in production. 		
Assessment and evaluation of student work during classes		
<p>Students are eligible for the final exam after accumulating a minimum number of assessments points throughout the semester. Assessments points are earned based on class attendance (at least 70%), participation in class activities, and results from partial exams. During the semester, students will take four partial exams (in weeks 7, 10, 13, and 16). The final exam is obligatory, oral and written. A passing grade on the final exam is a prerequisite for a positive final grade.</p>		
Obligatory literature		
<ol style="list-style-type: none"> 1. Vukadinović, V., Vukadinović, V. (2018): Zemljišni resursi – vrednovanje poljoprivrednih zemljišnih resursa. e-knjiga. http://pedologija.com.hr/Literatura/Zemljisni_resursi.pdf 2. Jug, I., Jug, D., Brozović, B., Vukadinović, V., Đurđević, B. (2022): Osnove tloznanstva i biljne proizvodnje. Fakultet agrobiotehničkih znanosti Osijek. Sveučilište Josipa Jurja Strossmayera u Osijeku, Osijek. 3. Vukadinović, V., Vukadinović, V. (2011): Ishrana bilja. Poljoprivredni fakultet u Osijeku. Osijek. 4. Bogunović, M., Čorić, R. (2014): Višenamjensko vrednovanje zemljišta i racionalno korištenje prostora. Sveučilište u Mostaru. Mostar. 5. Jurišić, M., Plaščak, I. (2009): Geoinformacijski sustav, GIS u poljoprivredni i zaštiti okoliša. Poljoprivredni fakultet u Osijeku. Osijek. 6. FAO (1976): A Framework for Land Evaluation. Food and Agriculture Organizations of the United Nations. Rome. http://www.fao.org/docrep/x5310e/x5310e00.htm 7. AZO (2008): Program trajnog motrenja tla. Projekt Izrada Programa trajnoga motrenja tala Hrvatske s pilot projektom LIFE05 TCY/CRO 000105. Agencija za zaštitu okoliša. Zagreb. 8. Jug, D., Birkás, M., Kisić, I. (2015): Obrada tla u agroekološkim okvirima. Poljoprivredni fakultet u Osijeku, Sveučilište Josipa Jurja Strossmayera u Osijeku. 		
Additional literature		
<ol style="list-style-type: none"> 1. Pernar, N. Bakšić, D., Perković, I. (2013.): Terenska i laboratorijska istraživanja tla - priručnik za uzorkovanje i analizu. Šumarski fakultet Sveučilišta u Zagrebu, Hrvatske šume d.o.o. 2. Đurđević, B. (2014.): Praktikum iz ishrane bilja. Sveučilište J.J. Strossmayera u Osijeku, Poljoprivredni fakultet u Osijeku. Osijek. http://ishranabilja.com.hr/literatura/Praktikum%20iz%20ishrane%20bilja.pdf 3. Mirošević, N., Karoglan-Kontić, J. (2008): Vinogradarstvo – izabrana poglavlja. Udžbenici Sveučilišta u Zagrebu. Nakladni zavod Globus. Zagreb. 		

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4. Jug, D., Jug, I., Vukadinović, V., Đurđević, B., Stipešević, B., Brozović, B. (2017): Konzervacijska obrada tla kao mjera ublažavanja klimatskih promjena. Hrvatsko društvo za proučavanje obrade tla. Osijek.
5. FAO (1993): Guidelines for land-use planning. FAO Development Series 1. Rome.
<https://www.fao.org/3/t0715e/t0715e00.htm>
6. Smyth, A.J., Dumanski, J., Spendjian, G., Swift, M.J., Thornton, P.K. (1993): FESLM: An international framework for evaluating sustainable land management. World Soil Resources Report, FAO. Rome.
<https://www.fao.org/3/T1079E/t1079e00.htm#Contents>
7. Kalogirou, S. (2002): Expert systems and GIS: an application of land suitability evaluation. Computers, Environment and Urban Systems. 26: 89-112.
8. FAO (1996): Agro-ecological Zoning, Guidelines. Food and Agriculture Organizations of the United Nations. Rome. <http://www.fao.org/docrep/w2962e/w2962e00.htm>
Frančula N. (2004): Digitalna kartografija - treće prošireno izdanje. Sveučilište u Zagrebu, Geodetski fakultet. Zagreb.

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MECHANIZATION IN FRUIT GROWING, VITICULTURE AND WINE PRODUCTION		
Coordinator	Đuro Banaj	
Collaborators	Vjekoslav Tadić, Anamarija Banaj	
Study year and semester	First Year, 1st Semester	
Number of credits and mode of delivery	ECTS credits	6
	(L+E+S)	(62L + 13 E)
COURSE DESCRIPTION		
Course aims	The goal of this course is to familiarize students with the machinery, devices, and equipment used in modern fruit growing, viticulture, and oenology practices. This will enable students to acquire new knowledge in the development of techniques and technologies in the aforementioned segments of fruit growing and viticultural production.	
Course enrolment requirements	None	
Intended course learning outcomes		
<p>Upon successful completion of the module, the student will be able to:</p> <ol style="list-style-type: none"> 1. List the main tasks of technical systems on agricultural machinery and equipment in fruit growing, viticulture, and oenology. 2. Explain the impact of machinery and equipment on work performance and work quality. 3. Select new technologies that will reduce inputs in fruit growing and viticulture production. 4. Choose the most suitable machinery for soil maintenance in permanent crops. 5. Explain the principles of operation of machinery for pesticide application in permanent crops. 6. Choose and explain the appropriate machinery for fruit and grape harvest. 7. Explain the trends in technological development in fruit growing and viticulture. 		
Assessment and evaluation of student work during classes		
Students are eligible for the final exam after accumulating the minimum required assessments points. Assessments points are earned based on class attendance (at least 70%), participation in class activities, and results from partial exams. The final exam is obligatory, and a passing grade on the final exam is required for a positive final grade. The final exam is written.		
Obligatory literature		
<ol style="list-style-type: none"> 1. Sito, S., Bilandžija, N. (2013): Tehnika u voćarstvu i vinogradarstvu, Interna skripta, Agronomski fakultet u Zagrebu 2. Lukač, P., Pandurović, T. (2011): Strojevi za berbu voća i grožđa, Poljoprivredni fakultet u Osijeku, Osijek, 3. Banaj, Đ., Tadić, V., Banaj Željka, Lukač, P.(2013): Unapređenje tehnike aplikacije pesθ cida, Poljoprivredni fakultet u Osijeku, Osijek, 4. Zimmer, R., Košutić, S., Zimmer, D. (2009.): Poljoprivredna tehnika u ratarstvu, Udžbenik Sveučilišta J. J. Strossmayera u Osijeku. Banaj, Đ., Šmrčković P. (2003): Upravljanje poljoprivrednom tehnikom, Poljoprivredni fakultet, Osijek 		
Additional literature		
<ol style="list-style-type: none"> 1. Brčić, J.: Mehanizacija u biljnoj proizvodnji, „Školska knjiga“, Zagreb, 1987. 2. Brčić, J.: Mehanizacija u povrćarstvu, Fakultet poljoprivrednih znanosti, Zagreb, 1991. 3. Zimmer, R., Košutić, S., Kovačev, I., Zimmer, D.: Integralna tehnika obrade tla i sjetve, Poljoprivredni fakultet u Osijeku. 2014. 		

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BREEDING OF FRUIT TREES, VINE AND SEEDLING PRODUCTION		
Coordinator	Vladimir Jukić	
Collaborators	Aleksandar Stanisavljević, Mato Drenjančević, Toni Kujundžić, Dejan Bošnjak	
Study year and semester	First Year, 1st Semester	
Number of credits and mode of delivery	ECTS credits	6
	(L+E+S)	75 (70 L + 5 E)
COURSE DESCRIPTION		
Course aims	The aim of this course is to familiarize students with classical and modern methods of plant material creation and propagation, the theory of breeding, breeding methods, and the possibilities of applying these methods to achieve breeding objectives. Students will gain skills in organizing nursery production and managing nurseries in fruit growing and viticulture.	
Course enrolment requirements	None	
Intended course learning outcomes		
<p>Upon successful completion of the module, the student will be able to:</p> <ol style="list-style-type: none"> 1. Describe the goals and importance of breeding in fruit growing and viticulture, and provide a historical overview of fruit tree and grapevine breeding. 2. Distinguish between systematic units in fruit trees and grapevines and understand the genetic basis of breeding. 3. Present the significance of initial material for breeding and the cytogenetic characteristics of fruit trees and grapevines. 4. Analyze selection methods and the process of creating new varieties and rootstocks, with a special focus on genetic resistance to diseases and pests. 5. Present the latest results in breeding. 6. Describe the methods of propagation for specific plant species of interest, the development of nurseries, and the organization of commercial fruit and viticulture nurseries. 		
Assessment and evaluation of student work during classes		
The final grade will be determined by continuous monitoring of students' participation in class (classroom activity, preparation for lessons, reflective review of course content), regular knowledge checks (partial exams), and a final oral exam. The final exam is obligatory as well as the attendance according to the Regulations on Studies at the J.J. Strossmayer University of Osijek.		
Obligatory literature		
<ol style="list-style-type: none"> 1. Maletić, E., Karoglan Kontić, J., Pejić, I. (2008): Vinova loza – ampelografija, ekologija, oplemenjivanje, Školska knjiga, Zagreb 2. Mirošević, N. (2007): Razmnožavanje loze i lozno rasadničarstvo, Gm-tehnička knjiga, Zagreb Šoškić, M. (199.): Oplemenjivanje voćaka i vinove loze, Papiruss, Beograd 		
Additional literature		
<ol style="list-style-type: none"> 1. Galet, P. (1998): Grape varieties and rootstock varieties, Avenir Oenologie, Chaintre, France 2. Janick, J., J. N. Moore (1996): Fruit Breeding, John Wiley & Sons, New York 3. Dojiode, S.D. (2001): Seed Storage of Horticultural Crops, Haworth Press Jarebica, D.Ž., Kurtović, M. (1997): Oplemenjivanje voćaka i vinove loze, Sarajevo 		

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ECONOMICS OF FRUITS, GRAPES AND WINE PRODUCTION		
Coordinator	Ana Crnčan	
Collaborators	Ružica Lončarić, Sanja Jelić Milković	
Study year and semester	First Year, 1st Semester	
Number of credits and mode of delivery	ECTS credits	6
	(L+E+S)	75 (50 L+ 15 E + 10 S)
COURSE DESCRIPTION		
Course aims	<i>The aim of this course is to train students in properly structuring and maintaining favorable relationships between factors involved in the production of fruit, grapes, and wine, in performing work processes efficiently, and in managing work processes successfully to achieve economical and profitable production.</i>	
Course enrolment requirements	None	
Intended course learning outcomes		
<p>Upon successful completion of the module, the student will be able to:</p> <ol style="list-style-type: none"> 1. Define the structure of agricultural enterprises and analyze production theory. 2. Calculate the optimal level of investment intensity in accordance with market price levels. 3. Set performance standards for labor and machine operations in fruit orchards and vineyards. 4. Identify and explain the costs of working tools, raw materials, labor, depreciation, and interest. 5. Demonstrate the movement of fixed, variable, and total costs. 6. Prepare cost calculations and analyze labor productivity, economic efficiency, and profitability of production. 7. Distinguish the structure of agricultural product markets and market factors. 8. Identify and analyze all McCarthy's elements of the marketing mix. 9. Define the main elements of the communication marketing mix in the production of fruit, grapes, and wine. 		
Assessment and evaluation of student work during classes		
Students are eligible for the final exam after accumulating a minimum number of assessments points. Assessments points are earned based on class attendance (at least 70%), participation in class, results from partial exams, and a seminar paper. During the semester, students will take two partial exams and present a seminar paper. The final exam is obligatory, and a passing grade on the final exam is required for a positive final grade. The final exam is written.		
Obligatory literature		
<ol style="list-style-type: none"> 1. Bendeković, J. i sur. (2007): Priprema i ocjena investicijskih projekata, FOIP, Zagreb 2. Karić, M. (2002): Kalkulacije u poljoprivredi, Poljoprivredni fakultet u Osijeku, Osijek Tolušić, Z. (2007): Tržište i distribucija poljoprivredno-prehrambenih proizvoda, Poljoprivredni fakultet u Osijeku, Osijek 		
Additional literature		
<ol style="list-style-type: none"> 1. Karić, M. (2006): Mikroekonomika, Ekonomski fakultet u Osijeku, Osijek 2. Uredba o obrascu i načinu vrednovanja gospodarskog programa korištenja poljoprivrednog zemljišta u vlasništvu Republike Hrvatske, https://narodne-novine.nn.hr/clanci/sluzbeni/2016_09_79_1799.html 		

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FRUIT GROWING I		
Coordinator	Aleksandar Stanisavljević	
Collaborators	Dejan Bošnjak	
Study year and semester	First Year, 2nd Semester	
Number of credits and mode of delivery	ECTS credits	6
	(L+E+S)	75 (60 L + 10 E + 5 S)
COURSE DESCRIPTION		
Course aims	The goal of this course is to introduce students to the functional relationship between biological knowledge of fruit species and their implementation in the modern agricultural production system. It aims to teach students how to directly understand scientific and professional knowledge in fruit growing.	
Course enrolment requirements	None	
Intended course learning outcomes		
<p>Upon successful completion of the module, the student will be able to:</p> <ol style="list-style-type: none"> 1. Describe and define the general and economic importance of fruit crops, the systematics of fruit species, agroecological requirements, and their biology. 2. Understand phenology and types of reproduction. 3. Perform pruning and planting. 4. Calculate tree load (crop load) and fertilization needs. 5. Describe the morphological characteristics and physiology of different fruit species and the specificities of varieties. 		
Assessment and evaluation of student work during classes		
<p>Students are expected to attend classes regularly and actively participate in tasks during lectures. In the second part of the course, fieldwork and exercises will be organized in the orchard. Attendance to field classes is obligatory. Exercises will involve experimental work and continuous research with a focus on the practical aspects, both <i>in vivo</i> and in laboratory conditions.</p> <p>In the second part of the course, students will complete an independent seminar paper, which is obligatory. The seminar paper will be presented orally, lasting 10 to 15 minutes, with a PowerPoint presentation. The schedule for presentations will be agreed in advance.</p> <p>After the lectures and exercises, students will take a 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 to assist in explaining the lecture content. Printed copies of these presentations (handouts) will be made available to students.</p> <p>The final grade will be determined based on continuous monitoring of class participation (activity, preparation for lessons, and reflective review of course content), participation in exercises, and the quality of the seminar paper. The seminar paper grade will consider clarity, accuracy, relevance of the information presented, and the overall (technical and visual) quality of the presentation.</p> <p>The final exam is oral. Attendance is obligatory according to the Regulations on Studies at J. J. Strossmayer University in Osijek</p>		
Obligatory literature		
<ol style="list-style-type: none"> 1. Jemrić, Tomislav (2007): Cijepljenje i rezidba voćaka, Naklada Uliks, Rijeka 2. Westwood, M. N. (1993): Temperature-zone pomology: physiology and culture, Timber Press, Inc., USA 3. Jackson, J. E. (2003): Biology of apples and pears, Cambridge University Press, UK 4. Faust, M. (1989): Physiology of temperate zone fruit trees, John Wiley&Sons, Inc, USA 5. Baugher, T., Singha, S. (2003): Concise Encyclopedia of Temperate Tree Fruit, Haworth Press 6. Jelaska, S. (1994.): Kultura biljnih stanica i tkiva. Školska knjiga. Zagreb 7. Tijekom izvođenja nastave odrediti će se najnoviji radovi objavljeni u referentnim međunarodnim časopisima koji će služiti za pripremu seminara 8. https://fruit.cornell.edu/ https://www.canr.msu.edu/fruit/ 		
Additional literature		

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1. Brzica, K. (1995): Jabuka, Biblioteka selo i hrana, Zagreb
2. Brzica, K. (1992): Uzgoj i rezidba voćaka, Biblioteka selo i hrana, Zagreb
3. Bulatović, S. (1989): Savremeno voćarstvo, Nolit, Beograd
4. Miljković, Ivo (1991): Suvremeno voćarstvo, Znanje, Zagreb (knjiga)
5. <https://www.fao.org/home/en>
6. <https://www.freshplaza.com/europe/>
Znanstveni i stručni radovi iz relevantnih časopisa i baza vezani za voćarsku proizvodnju

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FRUIT GROWING II		
Coordinator	Aleksandar Stanisavljević	
Collaborators	Dejan Bošnjak	
Study year and semester	First Year, 2nd Semester	
Number of credits and mode of delivery	ECTS credits	6
	(L+E+S)	75 (60 L + 10 E + 5 S)
COURSE DESCRIPTION		
Course aims	This course aims to familiarize students with the heterogeneity of fruit crop varieties and the principles of selection. It provides a practical approach to the development of conceptual and detailed project documentation for establishing commercial orchards. Students will be trained in agro-technical and pomotechnical procedures through demonstrations.	
Course enrolment requirements	None	
Intended course learning outcomes		
<p>Upon successful completion of the module, the student will be able to:</p> <ol style="list-style-type: none"> 1. Understand and describe the genesis of cultivars, methods of testing variety quality, and the policy of national variety lists, including leading, accompanying, and promising varieties. 2. Evaluate the quality of fruit varieties. 3. Design orchard planting projects. 4. Develop conceptual and detailed project documentation for establishing commercial orchards. 5. Carry out pomotechnical procedures. 6. Present agro-technical procedures. 		
Assessment and evaluation of student work during classes		
<p>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 the orchard. Attendance to field classes is obligatory. Exercises are designed around experimental work and ongoing research with an emphasis on the practical aspects, either in vivo or in laboratory conditions.</p> <p>In the second part of the module, students will prepare an independent seminar paper, which is obligatory. The seminar paper will be presented orally, lasting 10 to 15 minutes, with a PowerPoint presentation. The presentation schedule will be arranged in advance.</p> <p>After the lectures and exercises, students will take a final oral exam. Students are encouraged to take notes during lectures and prepare for the exam using the required literature. PowerPoint presentations will be used during lectures to help explain the topics being discussed. Printed copies of the presentations (handouts) will be available to students.</p> <p>The final grade will be determined based on continuous monitoring of class participation (activity, preparation for lessons, and reflective review of course content), participation in exercises, and the quality of the seminar paper. The evaluation of the seminar paper will consider clarity, accuracy, and relevance of the written content, as well as the overall (technical and visual) quality of the presentation.</p> <p>The final exam is oral. Attendance is obligatory in accordance with the Regulations on Studies at J.J. Strossmayer University in Osijek.</p>		
Obligatory literature		
<ol style="list-style-type: none"> 1. Jemrić, Tomislav (2007): Cijepljenje i rezidba voćaka, Naklada Uliks, Rijeka 2. Westwood, M. N. (1993): Temperature-zone pomology: physiology and culture, Timber Press, Inc., USA 3. Jackson, J. E. (2003): Biology of apples and pears, Cambridge University Press, UK 4. Faust, M. (1989): Physiology of temperate zone fruit trees, John Wiley&Sons, Inc, USA 5. Baugher, T., Singha, S. (2003): Concise Encyclopedia of Temperate Tree Fruit, Haworth Press 6. Krpina, I. (2004): Voćarstvo, Nakladni zavod Globus, Zagreb 7. Gliha, R. (1997): Sorte krušaka u suvremenoj proizvodnji, Fragaria d.o.o., Zagreb 8. Gliha, R. (1978): Sorte jabuka u suvremenoj proizvodnji, Radničko sveučilište Moše Pijade, Zagreb 9. Jelaska, S. (1994.): Kultura biljnih stanica i tkiva. Školska knjiga. Zagreb 		

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|---|
| <ol style="list-style-type: none">10. Tijekom izvođenja nastave odrediti će se najnoviji radovi objavljeni u referentnim međunarodnim časopisima koji će služiti za pripremu seminara11. https://fruit.cornell.edu/
https://www.canr.msu.edu/fruit/ |
|---|

Additional literature

- | |
|---|
| <ol style="list-style-type: none">1. Brzica, K. (1995): Jabuka, Biblioteka selo i hrana, Zagreb2. Brzica, K. (1992): Uzgoj i rezidba voćaka, Biblioteka selo i hrana, Zagreb3. Bulatović, S. (1989): Savremeno voćarstvo, Nolit, Beograd4. Miljković, Ivo (1991): Suvremeno voćarstvo, Znanje, Zagreb (knjiga)5. https://www.fao.org/home/en6. https://www.freshplaza.com/europe/
Znanstveni i stručni radovi iz relevantnih časopisa i baza vezani za voćarsku proizvodnju |
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Fruit Growing, Viticulture, and Wine Production (University Graduate Study Programme)
Major in **FRUIT GROWING**

ECOLOGICAL FRUIT GROWING		
Coordinator	Aleksandar Stanisavljević	
Collaborators	Dejan Bošnjak	
Study year and semester	First Year, 2nd Semester	
Number of credits and mode of delivery	ECTS credits	6
	(L+E+S)	75 (65 L + 10 E)
COURSE DESCRIPTION		
Course aims	This course aims to familiarize students with the role of ecological products in Croatia and the world, EU legislation and standards, and the technological requirements for selecting production models based on their intended purpose. Topics covered include soil management in organic orchards, nutrition, pruning, protection, harvesting, and storage within the principles of integrated and ecological production.	
Course enrolment requirements	None	
Intended course learning outcomes		
<p>Upon successful completion of the module, the student will be able to:</p> <ol style="list-style-type: none"> 1. Clearly identify the economic significance, requirements, and standards of organic fruit production in Croatia. 2. Understand the structure of relevant global organic fruit production and consumption (FAO). 3. Define, explain, and adapt the production model according to the chosen concept (organic, integrated, conventional). 4. Describe the transition between complementary fruit production models. 5. Define the agro-ecological factors that determine the possibilities of growing specific fruit species based on ecological criteria. 6. Understand and define agro-technical procedures. 7. Understand and apply pomotechnical procedures. 8. Recognize diseases and pests. 9. Describe models for disease and pest control in organic and integrated production systems. 10. Understand breeding models for selecting resistant and tolerant varieties. 11. Compare the economic efficiency of selected production models (production costs, marketing, and sales). 		
Assessment and evaluation of student work during classes		
<p>Students are expected to attend classes regularly and actively participate in tasks during lectures. In the second part of the module, fieldwork will be organized, which will take place in the orchard. Attendance at field classes is obligatory.</p> <p>In the second part of the module, students will prepare an independent seminar paper, which is obligatory. The seminar paper will be presented orally, lasting 10 to 15 minutes, with a PowerPoint presentation. After the lectures and exercises, students will take a final oral exam. Students are encouraged to take notes during lectures and prepare for the exam using the required literature. PowerPoint presentations will be used during lectures to help explain the topics being discussed. Printed copies of the presentations (handouts) will be available to students.</p> <p>The final grade will be determined based on continuous monitoring of class participation (activity, preparation for lessons, and reflective review of course content), as well as the quality of the seminar paper. The evaluation of the seminar paper will take into account clarity, accuracy, and relevance of the written content, as well as the overall (technical and visual) quality of the presentation. The final grade will also be influenced by the student's willingness and activity in participating in experimental work or research.</p> <p>The final exam is oral. Attendance is obligatory in accordance with the Regulations on Studies at J.J. Strossmayer University in Osijek. If a student misses more than 30% of the teaching hours, they will lose the right to sign the course.</p>		
Obligatory literature		
<ol style="list-style-type: none"> 1. Jemrić, Tomislav (2007): Cijepljenje i rezidba voćaka, Naklada Uliks, Rijeka 2. https://poljoprivreda.gov.hr/ekoloska/199 		

Fruit Growing, Viticulture, and Wine Production (University Graduate Study Programme)
Major in **FRUIT GROWING**

3. Pravilnik o kontrolnom sustavu ekološke poljoprivrede https://narodne-novine.nn.hr/clanci/sluzbeni/2022_09_110_1625.html
4. Pravilnik o provedbi izravne potpore poljoprivredi i IAKS mjera ruralnog razvoja za 2023. Godinu https://narodne-novine.nn.hr/clanci/sluzbeni/2023_03_25_410.html
5. Pravila EU-a o proizvodnji i označivanju ekoloških proizvoda (od 2022.) <https://eur-lex.europa.eu/HR/legal-content/summary/eu-rules-on-producing-and-labelling-organic-products-from-2022.html>
6. Zakonska regulativa ekološke proizvodnje: <https://stampar.hr/sites/default/files/2022-01/Zakonska%20regulativa-web%20%E2%80%93%20Novo.pdf>
7. M11 – Ekološki uzgoj <https://ruralnirazvoj.hr/mjera/m11/>
8. Tijekom izvođenja nastave odrediti će se najnoviji radovi objavljeni u referentnim međunarodnim časopisima koji će služiti za pripremu seminara
9. <https://fruit.cornell.edu/>
<https://www.canr.msu.edu/fruit/>

Additional literature

1. Dr. Rueß Franz (2007): Resistente und Robuste kernobstsorten, Weinsberg
2. Krpina, Ivo (2004): Voćarstvo, Nakladni zavod Globus, Zagreb (knjiga)
3. <https://iobc-wprs.org/>
4. <https://bioter.hr/ekoloska-poljoprivreda/zakoni-i-pravilnici/>
Hrvatska agencija za poljoprivredu i hranu - Centar za voćarstvo i povrćarstvo - Tehnološke smjernice za voćnjake

Fruit Growing, Viticulture, and Wine Production (University Graduate Study Programme)
Major in **FRUIT GROWING**

TECHNOLOGY OF HARVEST AND STORAGE		
Coordinator	Darko Kiš	
Collaborators	Zvonimir Zdunić	
Study year and semester	First Year, 1st Semester	
Number of credits and mode of delivery	ECTS credits	6
	(L+E+S)	75 (50 L + 25 E)
COURSE DESCRIPTION		
Course aims	The aim of this course is to enable students of the Master's degree program to master the material and acquire knowledge necessary for achieving optimal practices in fruit harvesting and storage in practical scenarios.	
Course enrolment requirements	None	
Intended course learning outcomes		
<p>Upon successful completion of the module, students will be able to:</p> <ol style="list-style-type: none"> 1. Differentiate between methods of fruit harvesting. 2. Identify and apply the appropriate machinery and equipment used in fruit harvesting. 3. List the basic tasks related to fruit storage and describe the factors that influence the viability of stored fruit. 4. Solve issues related to fruit drying. 5. Differentiate between types of fruit dryers. 6. Differentiate between types of cooling systems and cold storage facilities for fruits. 		
Assessment and evaluation of student work during classes		
To be eligible for the final exam, students must collect a minimum number of assessment points. Assessment points are awarded based on attendance (minimum 70%), active participation in class, and other activities. The final exam is obligatory, and a positive grade in the final exam is required to pass the course. The final exam is oral.		
Obligatory literature		
<ol style="list-style-type: none"> 1. Ritz, Josip (1997): Uskladištavanje ratarskih proizvoda. PBI d.o.o. Zagreb (udžbenik) 2. Babić, Ljiljina; Babić Mirko (2000): Sušenje i skladištenje. Poljoprivredni fakultet, Novi Sad 3. Zvonko Katić (1997): Sušenje i sušare u poljoprivredi, Multigraf, Zagreb <p>Lovrić, T., Vlasta Piližota (1994.): Konzerviranje i prerada voća i povrća. Nakladni zavod Globus, Zagreb</p>		
Additional literature		

Fruit Growing, Viticulture, and Wine Production (University Graduate Study Programme)
Major in **FRUIT GROWING**

DISEASES AND PESTS PROTECTION IN FRUIT GROWING		
Coordinator	Karolina Vrandečić	
Collaborators	Jasenka Ćosić, Ankica Sarajlić, Josipa Puškarić, Tamara Siber	
Study year and semester	First Year, 2nd Semester	
Number of credits and mode of delivery	ECTS credits	6
	(L+E+S)	75 (57 L + 18 E)
COURSE DESCRIPTION		
Course aims	The aim of this course is to introduce Master's students to the systematics of fungi and their biology, ecology, and the control measures for important plant pathogens and pests in fruit cultivation. The course also covers pest forecasting and control measures for major pests in fruit farming.	
Course enrolment requirements	None	
Intended course learning outcomes		
<p>Upon successful completion of the course, students will be able to:</p> <ol style="list-style-type: none"> 1. Describe the characteristics of the systematic units of pseudofungi and fungi. 2. Describe the symptoms, biology, and ecology of plant pathogens in fruit production. 3. Plan the implementation of protective measures against plant pathogens. 4. Describe the symptoms of damage and the biology of the most important harmful insects in fruit farming. 5. Recommend a pest control plan for harmful insects in fruit production. 6. Describe the symptoms and biology of major nematodes and vectors of viral diseases. 7. Recommend a control plan for phytoparasitic nematodes. 8. Comment on, argue, and critically analyze a given topic in the seminar paper. 		
Assessment and evaluation of student work during classes		
To be eligible for the final exam, students must collect a minimum number of credit points. Points are awarded based on class attendance (minimum 70%), class participation, and results from partial exams. During the semester, students will take two partial exams. The final exam is obligatory, and a positive grade on the final exam is required to pass the course. The final exam is oral.		
Obligatory literature		
<ol style="list-style-type: none"> 1. Cvjetković, B. (2010.): Mikoze i pseudomikoze voćaka i vinove loze. Zrinski d.d., Čakovec, 1-418. 2. Jurković, D., Ćosić, J. (2003.): Zaštita vinograda i voćnjaka od uzročnika bolesti. Veleučilište u Požegi. Skripta, 1-83. 3. Kišpatić, J (1992.): Bolesti voćaka i vinove loze. Sveučilište u Zagrebu. Agronomski fakultet, 1-292. 4. Ciglar, I. (1998.): Integrirana zaštita voćnjaka i vinograda. Sveučilište u Zagrebu. Agronomski fakultet, 5-301. 5. Ivezić M. (2003.):Štetnici vinove loze i voćaka. Veleučilište u Požegi i Rijeci. Skripta, 1- 133. 6. Ivezić, M. (2008): Entomologija- kukci i ostali štetnici u ratarstvu. Grafika do.o.o. Osijek, p.p. 202. 7. Ivezić, M. (2014): Fitonematologija. Grafika do.o.o. Osijek, p.p. 109. <p>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, Krrromopak, Valpovo, p.p.60.</p>		
Additional literature		
<ol style="list-style-type: none"> 1. (1995.): Compendium of Stone Fruit Diseases. APS Press, 1-98. 2. (1991.): Compendium of Raspberry and Blackberry Diseases and Insects. APS Press, 1-100 <p>Glasilo biljne zaštite brojevi od 2001. godine do danas</p>		

Fruit Growing, Viticulture, and Wine Production (University Graduate Study Programme)
Major in **FRUIT GROWING**

PRACTICAL WORK II		
Coordinator	Andrijana Rebekić	
Collaborators		
Study year and semester	Second Year, 3rd Semester	
Number of credits and mode of delivery	ECTS credits	6
	(L+E+S)	75 (60 L + 15 S)
COURSE DESCRIPTION		
Course aims	This course aims to educate students on the practical aspects of pomotechnical work in perennial fruit orchards. Students will learn to manage the processes involved in producing planting material, fruit production, and processing. The course will also provide practical training in conducting protective measures in orchards.	
Course enrolment requirements	None	
Intended course learning outcomes		
<p>Upon successful completion of the course, students will be able to:</p> <ol style="list-style-type: none"> 1. Plan and implement the establishment of a production orchard. 2. Carry out pomotechnical work in the process of forming growth forms in orchards. 3. Manage the processes of fruit production and harvesting. 4. Manage the processes of fruit processing. 5. Plan and implement the production of planting material. 6. Implement protective measures in orchards. 		
Assessment and evaluation of student work during classes		
Students are expected to attend classes regularly and actively participate in the tasks carried out during fieldwork. Students must keep a work journal documenting all activities during fieldwork. Attendance at fieldwork is obligatory. The final grade will be based on participation and the quality of the work journal.		
Obligatory literature		
Additional literature		

List of Teachers and Courses

Academic year 2022 - 23

Fruit Growing, Viticulture, and Wine Production

(University Graduate Study Programme)

Major in **VITICULTURE AND WINE PRODUCTION**

A full-time Study Programme

Fruit Growing, Viticulture, and Wine Production (University Graduate Study Programme)
Major in **VITICULTURE AND WINE PRODUCTION**

I. semester								
COORDINATOR	COURSE NAME	TEACHERS ON THE COURSE AND TYPE OF CLASSES						ECTS
		NAME AND SURNAME	LECTURES	SEMINARS	EXERCISES			
					FP	AP	LP	
Andrijana Rebecić	Biometrics	Andrijana Rebecić	45				30	6
Vesna Vukadinović	Land Resources Evaluation	Vesna Vukadinović Irena Jug	45 30					6
Đuro Banaj	Mechanization in fruit growing, viticulture and wine production	Đuro Banaj Vjekoslav Tadić Anamarija Banaj	30 32			13		6
Vladimir Jukić	Breeding of fruit trees, vine and seedling production	Vladimir Jukić Aleksandar Stanisavljević Mato Drenjančević Toni Kujundžić Dejan Bošnjak	25 25 10 10				5	6
Ana Crnčan	Economics of Fruits, Grapes and Wine Production	Ana Crnčan Ružica Lončarić Sanja Jelić Milković	30 20		10		15	6
II. semester								
COORDINATOR	COURSE NAME	TEACHERS ON THE COURSE AND TYPE OF CLASSES						ECTS
		NAME AND SURNAME	LECTURES	SEMINARS	EXERCISES			
					FP	AP	LP	
Vladimir Jukić	Viticulture I	Vladimir Jukić Mato Drenjančević Toni Kujundžić	45 10 10			10		6
Mato Drenjančević	Viticulture II	Vladimir Jukić Mato Drenjančević Toni Kujundžić	10 55			10		6
Toni Kujundžić	Wine Technology	Borislav Miličević	5					6

BIOMETRICS		
Coordinator	Andrijana Rebecić	
Collaborators		
Study year and semester	First year, I. semester	
Number of credits and mode of delivery	ECTS credits	6
	Number of hours (L+E+S)	75 (45 L + 30 E)
COURSE DESCRIPTION		
Course aims	To present and interpret the basics of scientific theory and scientific conclusion to graduate students through the application of statistical methods and tests.	
Course enrolment requirements	No enrolment requirements	
Intended course learning outcomes		
<p>After successfully completing the course, the student will be able to:</p> <ol style="list-style-type: none"> 1. Recognize basic statistical terminology. 2. Identify adequate experimental methods and techniques. 3. Set the research aims and scientific hypothesis. Organize and monitor the experiment, collect the experimental data, determine the sample size, edit the statistical series and group the data. 4. Calculate basic statistical parameters using descriptive statistical methods: measures of central tendency, measures of variation. 5. Properly apply parametric tests, analysis of variance, correlation-regression analysis, test time series. 6. Recognize and apply numerous diagrams as visual tools for presentations of experimental data. 7. Properly select and apply statistical non-parametric methods and analysis. 8. Recognize basics of software for statistical data analysis (Statistica, SAS). 9. Develop statistical (scientific) rethinking based on the results obtained by statistical analysis. 		
Assessment and evaluation of student work during classes		
<p>The right to take the final exam is obtained by accumulating a minimum number of assessment points. Assessment points are earned based on class attendance (at least 70%), 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 passing overall grade. The final exam is oral.</p>		
Obligatory literature		
<ol style="list-style-type: none"> 3. Horvat, D., Ivezić, M. (2005): Biometrika u poljoprivredi. Poljoprivredni fakultet u Osijeku. 4. Vasilj, Đ. (2000): Biometrika i eksperimentiranje u bilinogojstvu. Hrvatsko agronomsko društvo. Zagreb 		
Additional literature		
<ol style="list-style-type: none"> 4. Petz, B. (1985): Osnovne statističke metode za nematematičare. SNL, Zagreb. 5. Hadživuković, S. (1991): Statistički metodi s primenom u poljoprivrednim i biološkim istraživanjima. Poljoprivredni fakultet, Novi Sad 6. Mead, R., Curnow, R. N. and Hasted, A. M. (1993): Statistical Methods in Agriculture and Experimental Biology. Chapman & Hall. 		

LAND RESOURCES EVALUATION		
Coordinator	Vesna Vukadinović	
Collaborators	Irena Jug	
Study year and semester	First Year, 1st Semester	
Number of credits and mode of delivery	ECTS credits	6
	(L+E+S)	75 (75L)
COURSE DESCRIPTION		
Course aims	The aim of this course is to introduce the methodology for assessing and evaluating the suitability of land resources for permanent crops.	
Course enrolment requirements	None	
Intended course learning outcomes		
<p>Upon successful completion of the module, the student will be able to:</p> <ol style="list-style-type: none"> 1. Identify the morphological properties of soil and collect soil samples in the field. 2. Analyze, interpret, and apply the results of physical and chemical soil analyses in practice. 3. Classify soils according to specified criteria. 4. Create a database for assessing land suitability. 5. Recognize limitations of production areas and propose corrective measures before establishing vineyards or orchards. 6. Define the concept of monitoring, and plan, organize, and implement it on production areas. 7. Compare different methods for assessing land suitability for permanent crops. 8. Recommend fertilization practices for vineyards and orchards in production. 		
Assessment and evaluation of student work during classes		
<p>Students are eligible for the final exam after accumulating a minimum number of assessments points throughout the semester. Assessments points are earned based on class attendance (at least 70%), participation in class activities, and results from partial exams. During the semester, students will take four partial exams (in weeks 7, 10, 13, and 16). The final exam is obligatory, oral and written. A passing grade on the final exam is a prerequisite for a positive final grade.</p>		
Obligatory literature		
<ol style="list-style-type: none"> 1. Vukadinović, V., Vukadinović, V. (2018): Zemljišni resursi – vrednovanje poljoprivrednih zemljišnih resursa. e-knjiga. http://pedologija.com.hr/Literatura/Zemljisni_resursi.pdf 2. Jug, I., Jug, D., Brozović, B., Vukadinović, V., Đurđević, B. (2022): Osnove tloznanstva i biljne proizvodnje. Fakultet agrobiotehničkih znanosti Osijek. Sveučilište Josipa Jurja Strossmayera u Osijeku, Osijek. 3. Vukadinović, V., Vukadinović, V. (2011): Ishrana bilja. Poljoprivredni fakultet u Osijeku. Osijek. 4. Bogunović, M., Čorić, R. (2014): Višenamjensko vrednovanje zemljišta i racionalno korištenje prostora. Sveučilište u Mostaru. Mostar. 5. Jurišić, M., Plaščak, I. (2009): Geoinformacijski sustav, GIS u poljoprivredni i zaštiti okoliša. Poljoprivredni fakultet u Osijeku. Osijek. 6. FAO (1976): A Framework for Land Evaluation. Food and Agriculture Organizations of the United Nations. Rome. http://www.fao.org/docrep/x5310e/x5310e00.htm 7. AZO (2008): Program trajnog motrenja tla. Projekt Izrada Programa trajnoga motrenja tala Hrvatske s pilot projektom LIFE05 TCY/CRO 000105. Agencija za zaštitu okoliša. Zagreb. 8. Jug, D., Birkás, M., Kisić, I. (2015): Obrada tla u agroekološkim okvirima. Poljoprivredni fakultet u Osijeku, Sveučilište Josipa Jurja Strossmayera u Osijeku. 		
Additional literature		
<ol style="list-style-type: none"> 7. Pernar, N. Bakšić, D., Perković, I. (2013.): Terenska i laboratorijska istraživanja tla - priručnik za uzorkovanje i analizu. Šumarski fakultet Sveučilišta u Zagrebu, Hrvatske šume d.o.o. 8. Đurđević, B. (2014.): Praktikum iz ishrane bilja. Sveučilište J.J. Strossmayera u Osijeku, Poljoprivredni fakultet u Osijeku. Osijek. http://ishranabilja.com.hr/literatura/Praktikum%20iz%20ishrane%20bilja.pdf 9. Mirošević, N., Karoglan-Kontić, J. (2008): Vinogradarstvo – izabrana poglavlja. Udžbenici Sveučilišta u Zagrebu. Nakladni zavod Globus. Zagreb. 		

10. Jug, D., Jug, I., Vukadinović, V., Đurđević, B., Stipešević, B., Brozović, B. (2017): Konzervacijska obrada tla kao mjera ublažavanja klimatskih promjena. Hrvatsko društvo za proučavanje obrade tla. Osijek.
 11. FAO (1993): Guidelines for land-use planning. FAO Development Series 1. Rome.
<https://www.fao.org/3/t0715e/t0715e00.htm>
 12. Smyth, A.J., Dumanski, J., Spendjian, G., Swift, M.J., Thornton, P.K. (1993): FESLM: An international framework for evaluating sustainable land management. World Soil Resources Report, FAO. Rome.
<https://www.fao.org/3/T1079E/t1079e00.htm#Contents>
 9. Kalogirou, S. (2002): Expert systems and GIS: an application of land suitability evaluation. Computers, Environment and Urban Systems. 26: 89-112.
 10. FAO (1996): Agro-ecological Zoning, Guidelines. Food and Agriculture Organizations of the United Nations. Rome. <http://www.fao.org/docrep/w2962e/w2962e00.htm>
- Frančula N. (2004): Digitalna kartografija - treće prošireno izdanje. Sveučilište u Zagrebu, Geodetski fakultet. Zagreb.

MECHANIZATION IN FRUIT GROWING, VITICULTURE AND WINE PRODUCTION		
Coordinator	Đuro Banaj	
Collaborators	Vjekoslav Tadić, Anamarija Banaj	
Study year and semester	First Year, 1st Semester	
Number of credits and mode of delivery	ECTS credits	6
	(L+E+S)	(62L + 13 E)
COURSE DESCRIPTION		
Course aims	The goal of this course is to familiarize students with the machinery, devices, and equipment used in modern fruit growing, viticulture, and oenology practices. This will enable students to acquire new knowledge in the development of techniques and technologies in the aforementioned segments of fruit growing and viticultural production.	
Course enrolment requirements	None	
Intended course learning outcomes		
<p>Upon successful completion of the module, the student will be able to:</p> <ol style="list-style-type: none"> 1. List the main tasks of technical systems on agricultural machinery and equipment in fruit growing, viticulture, and oenology. 2. Explain the impact of machinery and equipment on work performance and work quality. 3. Select new technologies that will reduce inputs in fruit growing and viticulture production. 4. Choose the most suitable machinery for soil maintenance in permanent crops. 5. Explain the principles of operation of machinery for pesticide application in permanent crops. 6. Choose and explain the appropriate machinery for fruit and grape harvest. 7. Explain the trends in technological development in fruit growing and viticulture. 		
Assessment and evaluation of student work during classes		
Students are eligible for the final exam after accumulating the minimum required assessments points. Assessments points are earned based on class attendance (at least 70%), participation in class activities, and results from partial exams. The final exam is obligatory, and a passing grade on the final exam is required for a positive final grade. The final exam is written.		
Obligatory literature		
<ol style="list-style-type: none"> 1. Sito, S., Bilandžija, N. (2013): Tehnika u voćarstvu i vinogradarstvu, Interna skripta, Agronomski fakultet u Zagrebu 2. Lukač, P., Pandurović, T. (2011): Strojevi za berbu voća i grožđa, Poljoprivredni fakultet u Osijeku, Osijek, 3. Banaj, Đ., Tadić, V., Banaj Željka, Lukač., P.(2013): Unapređenje tehnike aplikacije pesθ cida, Poljoprivredni fakultet u Osijeku, Osijek, 4. Zimmer, R., Košutić, S., Zimmer, D. (2009.): Poljoprivredna tehnika u ratarstvu, Udžbenik Sveučilišta J. J. Strossmayera u Osijeku. 5. Banaj, Đ., Šmrčković P. (2003): Upravljanje poljoprivrednom tehnikom, Poljoprivredni fakultet, Osijek 		
Additional literature		
<ol style="list-style-type: none"> 1. Brčić, J.: Mehanizacija u biljnoj proizvodnji, „Školska knjiga“, Zagreb, 1987. 2. Brčić, J.: Mehanizacija u povrćarstvu, Fakultet poljoprivrednih znanosti, Zagreb, 1991. 3. Zimmer, R., Košutić, S., Kovačev, I., Zimmer, D.: Integralna tehnika obrade tla i sjetve, Poljoprivredni fakultet u Osijeku. 2014. 		

BREEDING OF FRUIT TREES, VINE AND SEEDLING PRODUCTION		
Coordinator	Vladimir Jukić	
Collaborators	Aleksandar Stanisavljević, Mato Drenjančević, Toni Kujundžić, Dejan Bošnjak	
Study year and semester	First Year, 1st Semester	
Number of credits and mode of delivery	ECTS credits	6
	(L+E+S)	75 (70 L + 5 E)
COURSE DESCRIPTION		
Course aims	The aim of this course is to familiarize students with classical and modern methods of plant material creation and propagation, the theory of breeding, breeding methods, and the possibilities of applying these methods to achieve breeding objectives. Students will gain skills in organizing nursery production and managing nurseries in fruit growing and viticulture.	
Course enrolment requirements	None	
Intended course learning outcomes		
<p>Upon successful completion of the module, the student will be able to:</p> <ol style="list-style-type: none"> 1. Describe the goals and importance of breeding in fruit growing and viticulture, and provide a historical overview of fruit tree and grapevine breeding. 2. Distinguish between systematic units in fruit trees and grapevines and understand the genetic basis of breeding. 3. Present the significance of initial material for breeding and the cytogenetic characteristics of fruit trees and grapevines. 4. Analyze selection methods and the process of creating new varieties and rootstocks, with a special focus on genetic resistance to diseases and pests. 5. Present the latest results in breeding. 6. Describe the methods of propagation for specific plant species of interest, the development of nurseries, and the organization of commercial fruit and viticulture nurseries. 		
Assessment and evaluation of student work during classes		
The final grade will be determined by continuous monitoring of students' participation in class (classroom activity, preparation for lessons, reflective review of course content), regular knowledge checks (partial exams), and a final oral exam. The final exam is obligatory as well as the attendance according to the Regulations on Studies at the J.J. Strossmayer University of Osijek.		
Obligatory literature		
<ol style="list-style-type: none"> 1. Maletić, E., Karoglan Kontić, J., Pejić, I. (2008): Vinova loza – ampelografija, ekologija, oplemenjivanje, Školska knjiga, Zagreb 2. Mirošević, N. (2007): Razmnožavanje loze i lozno rasadničarstvo, Gm-tehnička knjiga, Zagreb <ol style="list-style-type: none"> a. Šoškić, M. (199.): Oplemenjivanje voćaka i vinove loze, Papirus, Beograd 		
Additional literature		
<ol style="list-style-type: none"> 1. Galet, P. (1998): Grape varieties and rootstock varieties, Avenir Oenologie, Chaintre, France 2. Janick, J., J. N. Moore (1996): Fruit Breeding, John Wiley & Sons, New York 3. Dojiode, S.D. (2001): Seed Storage of Horticultural Crops, Haworth Press 4. Jarebica, D.Ž., Kurtović, M. (1997): Oplemenjivanje voćaka i vinove loze, Sarajevo 		

ECONOMICS OF FRUITS, GRAPES AND WINE PRODUCTION		
Coordinator	Ana Crnčan	
Collaborators	Ružica Lončarić, Sanja Jelić Milković	
Study year and semester	First Year, 1st Semester	
Number of credits and mode of delivery	ECTS credits	6
	(L+E+S)	75 (50 L+ 15 E + 10 S)
COURSE DESCRIPTION		
Course aims	<i>The aim of this course is to train students in properly structuring and maintaining favorable relationships between factors involved in the production of fruit, grapes, and wine, in performing work processes efficiently, and in managing work processes successfully to achieve economical and profitable production.</i>	
Course enrolment requirements	None	
Intended course learning outcomes		
<p>Upon successful completion of the module, the student will be able to:</p> <ol style="list-style-type: none"> 1. Define the structure of agricultural enterprises and analyze production theory. 2. Calculate the optimal level of investment intensity in accordance with market price levels. 3. Set performance standards for labor and machine operations in fruit orchards and vineyards. 4. Identify and explain the costs of working tools, raw materials, labor, depreciation, and interest. 5. Demonstrate the movement of fixed, variable, and total costs. 6. Prepare cost calculations and analyze labor productivity, economic efficiency, and profitability of production. 7. Distinguish the structure of agricultural product markets and market factors. 8. Identify and analyze all McCarthy's elements of the marketing mix. 9. Define the main elements of the communication marketing mix in the production of fruit, grapes, and wine. 		
Assessment and evaluation of student work during classes		
Students are eligible for the final exam after accumulating a minimum number of assessments points. Assessments points are earned based on class attendance (at least 70%), participation in class, results from partial exams, and a seminar paper. During the semester, students will take two partial exams and present a seminar paper. The final exam is obligatory, and a passing grade on the final exam is required for a positive final grade. The final exam is written.		
Obligatory literature		
<ol style="list-style-type: none"> 1. Bendeković, J. i sur. (2007): Priprema i ocjena investicijskih projekata, FOIP, Zagreb 2. Karić, M. (2002): Kalkulacije u poljoprivredi, Poljoprivredni fakultet u Osijeku, Osijek 3. Tolušić, Z. (2007): Tržište i distribucija poljoprivredno-prehrambenih proizvoda, Poljoprivredni fakultet u Osijeku, Osijek 		
Additional literature		
<ol style="list-style-type: none"> 1. Karić, M. (2006): Mikroekonomika, Ekonomski fakultet u Osijeku, Osijek 2. Uredba o obrascu i načinu vrednovanja gospodarskog programa korištenja poljoprivrednog zemljišta u vlasništvu Republike Hrvatske, https://narodne-novine.nn.hr/clanci/sluzbeni/2016_09_79_1799.html 		

VITICULTURE I		
Coordinator	Vladimir Jukić	
Collaborators	Mato Drenjančević Toni Kujundžić	
Study year and semester	First year, Second semester	
Number of credits and mode of delivery	ECTS credits	6
	(L+E+S)	75 (65 L + 10 E)
COURSE DESCRIPTION		
Course aims	To introduce students to the biology and cultivation possibilities of grapevine in agroecosystems. Detailed study of grapevine varieties and rootstocks, as well as methods for describing and evaluating varieties, vineyard areas, and legislation regarding grapevine.	
Course enrolment requirements	None	
Intended course learning outcomes		
<p>After successfully completing the module, the student will be able to:</p> <ol style="list-style-type: none"> 1. Define the origin of the grapevine, its morphology and anatomy, significant physiological functions, both the large and small cycles of grapevine development, and methods of grapevine propagation. 2. Describe the primary physiological processes in grapevines (photosynthesis, respiration, transpiration, translocation, and distribution of assimilates within the vine), and the role of factors influencing these physiological processes, such as light, temperature, water availability, and nutrient availability. 3. Describe the characteristics of soils and climatic factors that affect the growth and development of the grapevine. 4. Present climatic indices used in viticulture and topographic influences on grapevine growth and development, such as exposure to solar radiation, aspect, inclination, wind exposure, frost protection, altitude, geographical latitude, and proximity to large bodies of water. 5. Differentiate between sites suitable for grapevine cultivation. 6. Analyze significant rootstocks for grapevine cultivation, wine, and table cultivars, and the regionalization of viticulture areas in the world and Croatia. 		
Assessment and evaluation of student work during classes		
The final grade is determined based on continuous monitoring of the course (class participation, preparation for classes, reflective review of course content), continuous knowledge assessment (partial exams), and the final oral exam. Class attendance is obligatory in accordance with the Regulations on Studies and Studying at the J.J. Strossmayer University of Osijek.		
Obligatory literature		
<ol style="list-style-type: none"> 1. Mirošević, N., Karoglan Kontić, J. (2008): Vinogradarstvo, Nakladni zavod Globus, Zagreb 2. Maletić, E., Karoglan Kontić, J., Pejić, I. (2008): Vinova loza – ampelografija, ekologija, oplemenjivanje, Školska knjiga, Zagreb 3. Mirošević, N., Turković, Z. (2003): Ampelografski atlas, Golden marketing i tehnička knjiga, Zagreb 		
Additional literature		
<ol style="list-style-type: none"> 1. Fregoni, M. (1986): Viticultura generale, Universita Cattolica – Piacenza; REDA, Roma 2. Burić, D. (1981): Vinogradarstvo I, Ćirpanov, Novi Sad 3. Vršič, S., Lešnik, M. (2005): Vinogradništvo, Maribor 4. Jackson, R.S. (2000): Wine science. Academic Press, London 		

VITICULTURE II		
Coordinator	Mato Drenjančević	
Collaborators	Vladimir Jukić Toni Kujundžić	
Study year and semester	First year, Second semester	
Number of credits and mode of delivery	ECTS credits	6
	(L+E+S)	75 (65 L + 10 E)
COURSE DESCRIPTION		
Course aims	To thoroughly familiarize students with the techniques and specifics of establishing vineyards, vine pruning, and cultivation and harvesting systems. Building on previously acquired knowledge of soil maintenance and fertilization in vineyards.	
Course enrolment requirements	None	
Intended course learning outcomes		
<p>After successfully completing the module, the student will be able to:</p> <ol style="list-style-type: none"> 1. Create a plan for establishing a vineyard. 2. Differentiate between appropriate grapevine rootstocks based on the variety, ecological conditions of the site, and the desired type of vineyard production, planting technique, and vineyard care. 3. Propose grapevine training systems (training forms) through mature and green pruning. 4. Define soil maintenance methods in vineyards according to ecological conditions. 5. Interpret the results of soil chemical analysis, determine the grapevine's nutritional needs, and calculate the required quantities of mineral and organic fertilizers for vineyard fertilization. 6. Analyze production systems, grape harvesting, and processing, as well as the legal framework in viticulture and winemaking. 		
Assessment and evaluation of student work during classes		
The right to take the final exam is earned by accumulating a minimum number of assessment points. Assessment points are based on class attendance (minimum 70%), participation in class activities, and results from partial exams. During the semester, students take two partial exams (in the 7th and 15th weeks of the semester). The final exam is obligatory, and a passing grade on the final exam is a prerequisite for a final positive grade. The final exam is oral.		
Obligatory literature		
<ol style="list-style-type: none"> 1. Mirošević, N. Karoglan Kontić, J. (2008.): Vinogradarstvo, Nakladni zavod Globus, Zagreb 2. Maletić, E., Karoglan Kontić, J., Pejić, I. (2008.): Vinova loza – ampelografija, ekologija, oplemenjivanje, Školska knjiga, Zagreb 		
Additional literature		
<ol style="list-style-type: none"> 1. Fregoni, M. (1986.): Viticultura generale, Universita Cattolica – Piacenza; REDA, Roma 2. Burić, D. (1981.): Vinogradarstvo I, Ćirpanov, Novi Sad 3. Vršič, S., Lešnik, M. (2005.): Vinogradništvo, Maribor 4. Jackson, R.S. (2000.): Wine science. Academic Press, London 		

WINE TECHNOLOGY		
Coordinator	Toni Kujundžić	
Collaborators	Borislav Miličević Vladimir Jukić Toni Kujundžić	
Study year and semester	First year, Second semester	
Number of credits and mode of delivery	ECTS credits	6
	(L+E+S)	75 (40 L + 35 E)
COURSE DESCRIPTION		
Course aims	To introduce students in the Master's program to modern methods, operations, and processes in the technology of wine production.	
Course enrolment requirements	None	
Intended course learning outcomes		
<p>After successfully completing the module, the student will be able to:</p> <ol style="list-style-type: none"> 1. Understand the categories of wine according to quality and the quality parameters of wine. 2. Understand the chemical composition of grapes and the factors that influence the quality of grapes and wine. 3. Differentiate the technological potential of different grape varieties for wine production. 4. Understand the impact of climatic and environmental factors on the quality of grapes and wine. 5. Understand the chemical composition of must and wine. 6. Differentiate between enzymatic and non-enzymatic processes in must and wine. 7. Know the methods of sulfurization of must and wine, and understand the effect of sulfuric acid in wine. 8. Understand the technological processes for producing white, rosé, red, and special wines, and be familiar with the processing equipment used in wineries. 9. Understand the processes involved in wine stabilization. 10. Apply acquired knowledge to solve problems related to wine production. 11. Understand basic sensory, physico-chemical, and instrumental analytical techniques for determining and monitoring wine quality. 		
Assessment and evaluation of student work during classes		
The final grade will be based on continuous monitoring of the course (class participation, preparation for lessons, reflective review of course content), continuous knowledge assessments (partial exams), and the final oral exam. Class attendance is obligatory in accordance with the Regulations on Studies and Studying at the J.J. Strossmayer University of Osijek.		
Obligatory literature		
<ol style="list-style-type: none"> 1. S. Herjavec: Vinarstvo. Nakladni zavod globus, Zagreb, 2019. 2. P. Riberean Gayon, D. Dubourdieu, B. Doneche, A. Lonvaud: Handbook of Enology a. Volume II: The Chemistry of Wine Stabilization and Treatments. b. Volume I: The Microbiology of Wine and Vinifications, Wiley, 2000. 3. R. B. Boulton, V. L. Singleton, L. F. Bisson, R. I. Kuukee: Principelsw and Practies of Winemaking, The Chapman-Hall Enology Library, October 1995. 4. B. W. Zoecklein, K. C. Fugelsang, B. H. Gump, F. S. Nury, Wine Analisis and Production, The Chapman-Hall Enology Library, June 1995. 5. Muštović: Vinarstvo sa enohemijom i mikrobiologijom, Privredni pregled, Beograd, 1985. Licul, D. Premužić: Praktično vinogradarstvo i podrumarstvo, Nakladni zavod Znanje, Zagreb, 1977. 		
Additional literature		
<ol style="list-style-type: none"> 1. J. J. Hadiburg: Winning with Quality, The FP2 Story, New York, 1991. 2. K. C. Fugelsang: Wine Microbiology, The Chapman-Hall Enology Library, January 1997. 3. D. R. Storm: Winery Utilities, The Chapman-Hall Enology Library, January 1997. 4. R. P. Vine, B. Bordelon, T. Browning, Winemaking: Frof Grape growing to Marketplace, The Chapman-Hall Enology Library, June 1997 		

WINE MICROBIOLOGY		
Coordinator	Jurica Jović	
Collaborators	Suzana Kristek	
Study year and semester	First year, Second semester	
Number of credits and mode of delivery	ECTS credits	6
	(L+E+S)	L-55, E-20
COURSE DESCRIPTION		
Course aims	To introduce students to the characteristics of microorganisms involved in spontaneous or induced fermentation, in order to ensure optimal conditions for the production of high-quality wine and prevent the development of microorganisms that cause spoilage.	
Course enrolment requirements	None	
Intended course learning outcomes		
<p>After successfully completing the module, the student will be able to:</p> <ol style="list-style-type: none"> 1. Understand the morphology, classification, and determination of yeasts, molds, and bacteria. 2. Understand the microbiological fermentation of wine. 3. Identify the aromatic properties of wine. 4. Recognize spoilage in wine and apply methods for prevention. 5. Apply and interpret microbiological methods for isolating and determining bacteria and yeasts involved in wine fermentation in a laboratory setting. 		
Assessment and evaluation of student work during classes		
The final grade is based on continuous monitoring of the course (attendance, class participation, preparation for lessons, and reflective review of course content), exercises, written tests (2), and the final oral exam. A positive grade on the final exam is a prerequisite for the final grade. Attendance is obligatory—students must attend at least 70% of classes in order to be eligible for attendance on final exam.		
Obligatory literature		
<ol style="list-style-type: none"> 1. Duraković, S., Duraković, L. (2000): Specijalna mikrobiologija, Zagreb. 2. Muštović, S. (1985): Vinarstvo sa enohemijom i mikrobiologijom, Beograd 3. Fugelsang, C.K. (1997): Wine Microbiology, USA 4. Fugelsang, C.K., Edwards, G.C. (2007): Wine Microbiology, London Duraković, S. (2002): Moderna mikrobiologija namirnica, Zagreb 		
Additional literature		
<ol style="list-style-type: none"> 1. Romano, P., Ciani, M., Fleet, H.G. (eds) (2019): Yeasts in the Production of Wine, Springer, New York 2. Jacobson, L.J. (2006): Introduction to Wine Laboratory Practices and Procedures, Springer, USA 3. Zoecklein, W.B., Fugelsang, C.K., Gump, H.B., Nury, S.F. (1999): Wine analysis and production, Springer, New York 4. Duraković, S., Duraković, L. (1997): Priručnik za rad u mikrobiološkom laboratoriju, Zagreb 		

DISEASES AND PESTS PROTECTION IN VITICULTURE		
Coordinator	Karolina Vrandečić	
Collaborators	Jasenka Ćosić Ankica Sarajlić Josipa Puškarić Tamara Siber	
Study year and semester	First year, Second semester	
Number of credits and mode of delivery	ECTS credits	6
	(L+E+S)	L-60, S-15
COURSE DESCRIPTION		
Course aims	To introduce students to the biology and ecology of the most important pests and pathogens of grapevine, as well as the measures for their control.	
Course enrolment requirements	None	
Intended course learning outcomes		
<p>After successfully completing the module, the student will be able to:</p> <ol style="list-style-type: none"> 1. Describe the systematics and methods of sampling the most important pests and nematodes of grapevine. 2. Recognize symptoms on plants caused by attacks from harmful insects and phytopathogenic nematodes. 3. Describe the biology of harmful insects and nematodes in viticulture. 4. Recommend pest control plans for harmful insects and nematodes. 5. Describe the biology and systematics of the most important pathogens in viticulture. 6. Recognize symptoms of plant diseases in viticulture. 7. Recommend control measures for plant diseases in viticulture. 8. Comment, argue, and critically discuss a given seminar topic. 		
Assessment and evaluation of student work during classes		
The final grade is determined by continuous monitoring of the course (attendance, class participation, preparation for lessons, and reflective review of course content), the seminar paper, and partial knowledge checks or the final exam. The evaluation of the seminar paper will take into account the clarity, accuracy, and relevance of the information presented, as well as the overall (technical and visual) quality of the presentation.		
Obligatory literature		
<ol style="list-style-type: none"> 1. Ivezić M. (2003): Štetnici vinove loze i voćaka. Veleučilište u Požegi i Rijeci. Skripta, 1- 133. 2. Ivezić, M. (2014): Fitonematologija. Grafika do.o.o. Osijek, p.p. 109. 3. Ciglar, I. (1998): Integrirana zaštita voćnjaka i vinograda. Sveučilište u Zagrebu. Agronomski fakultet, 5-301. 4. Maceljki, M., Cvjetković, B., Ostojić, Z., Barić, B. (2006): Štetočinje vinove loze. Sveučilište u Zagrebu. Agronomski fakultet, 5-319. 5. Kišpatić, J (1992): Bolesti voćaka i vinove loze. Sveučilište u Zagrebu. Agronomski fakultet, 1-292. 6. Jurković, D., Ćosić, J. (2003.): Zaštita vinograda i voćnjaka od uzročnika bolesti. Veleučilište u Požegi. Skripta, 1-83. 7. Ćosić, J., Jurković, D., Vrandečić, K. (2006): Praktikum iz fitopatologije. www.pfos.hr Cvjetković, B. (2010): Mikoze i pseudomikoze voćaka i vinove loze. Zrinski d.d., Čakovec, 418-505. 		
Additional literature		
<ol style="list-style-type: none"> 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, Krromopak, Valpovo, p.p.60. 2. Ivezić, M. (2008): Entomologija- kukci i ostali štetnici u ratarstvu. Grafika do.o.o. Osijek, p.p. 202. 		

PRACTICAL WORK II		
Coordinator	Andrijana Rebekić	
Collaborators	N	
Study year and semester	Second year, Third semester	
Number of credits and mode of delivery	ECTS credits	6
	(L+E+S)	(60L + 15S)
COURSE DESCRIPTION		
Course aims	To master the technological processes in viticulture and winemaking production.	
Course enrolment requirements	None	
Intended course learning outcomes		
<p>After successfully completing the module, the student will be able to:</p> <ol style="list-style-type: none"> 1. Manage the process of grapevine cultivation and grape production. 2. Identify specific phases of the production cycle in viticulture and winemaking. 3. Recommend production technology for a specific production area. 4. Recognize grapevine diseases and pests and apply measures for their control. 5. Carry out grape harvesting and processing. 6. Interpret the processes involved in wine care, refinement, and storage. 		
Assessment and evaluation of student work during classes		
Students are expected to attend classes regularly and actively participate in tasks during fieldwork. Students are required to keep a work diary documenting all activities during field classes, and attendance at field classes is obligatory.		
Obligatory literature		
Additional literature		