

Biotechnical Faculty / PLANT PRODUCTION / PHYTOPHARMACY

Course:	PHYTOPHARMACY			
Course ID	Course status	Semester	ECTS credits	Lessons (Lessons+Exercises+Laboratory)
4807	Mandatory	5	5	3+0+1
Programs	PLANT PRODUCTION			
Prerequisites	None			
Aims	Introducing students to the basic concepts of pesticides, as well as issues related to their application, movement in the environment and the legal basis related to pesticides trade. Also, introduction to pesticide active substances that are on the list of permitted for use in agriculture and other areas. The aim of the course is to instruct students on personal and collective protection in the application of pesticides, as well as measures to be taken in case of their inadequate application.			
Learning outcomes	After passing the exam, the student will acquire knowledge that allows him to: • Define different groups of pesticides with special reference to plant protection products • Know the physical and chemical properties of pesticides and the formulations that are applied • Describe the mechanisms of pesticides action and all the basic groups of fungicides, insecticides and herbicides and active substances that are classified by groups • acquire knowledge on the basic regulations related to plant protection products in the European Union and Montenegro • Choose protective equipment for working with pesticides and know their impact on human health and the environment • Calculate the dose and concentration of applied fungicides, insecticides and herbicides			
Lecturer / Teaching assistant	Prof. dr Nedeljko Latinović Mr Bogoljub Kandić			
Methodology	Lectures, Laboratory practice, Field work, Seminars			
Plan and program of work				
Preparing week	Preparation and registration of the semester			
I week lectures	Introduction. Areas of pesticides application. Plant protection products. Control of vector-borne diseases			
I week exercises	Instructions for the application of plant protection products			
II week lectures	Classification and nomenclature of pesticides			
II week exercises	Calculation of water consumption for treatment			
III week lectures	Physical and chemical properties of pesticides			
III week exercises	Dose and concentration calculation			
IV week lectures	Forms of pesticide formulation. Integrated plant protection			
IV week exercises	Organizing the treatment of field crops			
V week lectures	Mode of action of pesticides			
V week exercises	Organizing the treatment of vegetable crops			
VI week lectures	Mode of action of pesticides			
VI week exercises	Organizing the treatment of vegetable crops			
VII week lectures	Fungicides			
VII week exercises	Organizing orchard treatment			
VIII week lectures	Fungicides, bactericides			
VIII week exercises	Organizing orchard treatment			
IX week lectures	Zoocides			
IX week exercises	Organizing vineyard treatment			
X week lectures	Zoocides. Plant protection products in organic agriculture. Pesticides and bees			
X week exercises	Use of protective equipment			
XI week lectures	Herbicides			
XI week exercises	Handling of devices for application of plant protection products			
XII week lectures	Herbicides			

XII week exercises	Field practice					
XIII week lectures	Legal bases of production, trade and application of pesticides					
XIII week exercises	Legislation in the field of plant protection products					
XIV week lectures	Pre-harvest interval. MRL. Consequences of pesticide application.					
XIV week exercises	Field practice					
XV week lectures	Pesticide toxicology and first aid.					
XV week exercises	Field practice					
Student workload						
Per week			Per semester			
5 credits x 40/30=6 hours and 40 minuts 3 sat(a) theoretical classes 1 sat(a) practical classes 0 excercises 2 hour(s) i 40 minuts of independent work, including consultations			Classes and final exam: 6 hour(s) i 40 minuts x 16 =106 hour(s) i 40 minuts Necessary preparation before the beginning of the semester (administration, registration, certification): 6 hour(s) i 40 minuts x 2 =13 hour(s) i 20 minuts Total workload for the subject: 5 x 30=150 hour(s) Additional work for exam preparation in the preparing exam period, including taking the remedial exam from 0 to 30 hours (remaining time from the first two items to the total load for the item) 30 hour(s) i 0 minuts Workload structure: 106 hour(s) i 40 minuts (cources), 13 hour(s) i 20 minuts (preparation), 30 hour(s) i 0 minuts (additional work)			
Student obligations			Students are required to attend classes, do seminar work, do all laboratory and field exercises and do both colloquiums.			
Consultations			After the lectures			
Literature			1. Šovljanski, Radmila, Lazić, Sanja (2007): Osnovi fitofarmacije, Poljoprivredni fakultet, Novi Sad; Janjić, V. (2005): Fitofarmacija, Društvo zazaštitu bilja Srbije. Beograd - Banja Luka; Šovljanski, Radmila, Klokočar-Schmit, Zlata, Lazić, Sanja (2002): Praktikum iz fitofarmacije, Novi Sad; Vitorović, S., Milošević, M. (2002): Osnovi toksikologije, Univerzitet u Beogradu. Beograd; Čengić-Džomba, S., Drkenda, P., Đikić, M., Gadžo, D., Latinović, N., Mirecki, N., Mirecki S. (2014): Organska proizvodnja. Univerzitet Crne Gore, Biotehnički fakultet Podgorica. Students will be provided with printed material for certain areas.			
Examination methods			Activities in lectures and exercises: 5 points Seminar paper: 5 points Two colloquia: 40 points Final exam: 50 points			
Special remarks						
Comment						
Grade:	F	E	D	C	B	A
Number of points	less than 50 points	greater than or equal to 50 points and less than 60 points	greater than or equal to 60 points and less than 70 points	greater than or equal to 70 points and less than 80 points	greater than or equal to 80 points and less than 90 points	greater than or equal to 90 points

Biotechnical Faculty / PLANT PROTECTION / DISEASES OF FRUITS AND GRAPEVINE

Course:	DISEASES OF FRUITS AND GRAPEVINE			
Course ID	Course status	Semester	ECTS credits	Lessons (Lessons+Exercises+Laboratory)
12365	Mandatory	2	6	3+0+2
Programs	PLANT PROTECTION			
Prerequisites	None			
Aims	After the student passes this exam, he/she will be able to: - define the role and importance of diseases in the cultivation of fruit trees and vine - recognize the symptoms of the most significant diseases of fruit trees and vine - state the prevalence and harmfulness, symptoms, characteristics of pathogens, development cycle and possible control measures of the most important diseases of pome fruits, stone fruits, small fruits, nuts, subtropical fruit tree and diseases that attack numerous plants (infected by polifagous pathogens) - choose the most adequate control measures against diseases in fruit tree and grapevine production.			
Learning outcomes	After the student passes this exam, he/she will be able to: - define the role and importance of diseases in the cultivation of fruit trees and vine - recognize the symptoms of the most significant diseases of fruit trees and vine - state the prevalence and harmfulness, symptoms, features of pathogens, development cycle and possible control measures of the most important diseases of pome fruits, stone fruits, small fruits, nuts, subtropical fruit trees and grapevine - choose the proper way of disease control in fruit tree and grapevine production.			
Lecturer / Teaching assistant	Full Professor Jelena Latinović, PhD - teacher / Bogoljub Kandić, MSc - assistant			
Methodology	Lectures, exercises (laboratory and in field), independent work, consultations, colloquiums and final exam			
Plan and program of work				
Preparing week	Preparation and registration of the semester			
I week lectures	Introduction to diseases of fruit trees and vine			
I week exercises	Laboratory exercises: basic characteristics of fruit trees and vine pathogens			
II week lectures	Introduction to diseases of fruit trees and vine			
II week exercises	Laboratory exercises: basic characteristics of fruit trees and vine pathogens			
III week lectures	Pome fruit diseases			
III week exercises	Recognizing the symptoms of diseased plants			
IV week lectures	Pome fruit diseases			
IV week exercises	Observation on herbarized plant material			
V week lectures	Pome fruit diseases, Stone fruit diseases			
V week exercises	Laboratory exercises: microscopy			
VI week lectures	Stone fruit diseases, I colloquium			
VI week exercises	Recognizing the symptoms of diseased plants			
VII week lectures	Stone fruit diseases, corrective I colloquium			
VII week exercises	Observation on herbarized plant material			
VIII week lectures	Stone fruit diseases			
VIII week exercises	Laboratory exercises: microscopy			
IX week lectures	Small fruit diseases			
IX week exercises	Recognizing the symptoms of diseased plants			
X week lectures	Small fruit diseases			
X week exercises	Observation on herbarized plant material			
XI week lectures	Nut tree diseases, II colloquium			
XI week exercises	Laboratory exercises: microscopy			
XII week lectures	Grapevine diseases, corrective II colloquium			

XII week exercises	Practice in field					
XIII week lectures	Grapevine diseases, Diseases of subtropical plants					
XIII week exercises	Sample processing and microscopy					
XIV week lectures	Diseases of subtropical plants					
XIV week exercises	Recognizing the symptoms of diseased plants					
XV week lectures	Diseases caused by polifagous pathogens					
XV week exercises	Observation on herbarized plant material					
Student workload						
Per week			Per semester			
6 credits x 40/30=8 hours and 0 minuts 3 sat(a) theoretical classes 2 sat(a) practical classes 0 excercises 3 hour(s) i 0 minuts of independent work, including consultations			Classes and final exam: 8 hour(s) i 0 minuts x 16 =128 hour(s) i 0 minuts Necessary preparation before the beginning of the semester (administration, registration, certification): 8 hour(s) i 0 minuts x 2 =16 hour(s) i 0 minuts Total workload for the subject: 6 x 30=180 hour(s) Additional work for exam preparation in the preparing exam period, including taking the remedial exam from 0 to 30 hours (remaining time from the first two items to the total load for the item) 36 hour(s) i 0 minuts Workload structure: 128 hour(s) i 0 minuts (cources), 16 hour(s) i 0 minuts (preparation), 36 hour(s) i 0 minuts (additional work)			
Student obligations			Students are required to attend classes, complete all laboratory and field exercises, do a seminar paper, both colloquiums and a final exam.			
Consultations			In agreement with students			
Literature			Ivanović, M., Ivanović, M. (2017): Bolesti voćaka i vinove loze. Univerzitet u Beogradu, Poljoprivredni fakultet, Beograd; 2. Mijušković, M. (1999): Bolesti i štetočine suptropskih voćaka, Univerzitet Crne Gore, Biotehnički institut, Podgorica; 3. Babović, M. (2003): Osnovi patologije biljaka, Univerzitet u Beogradu, Poljoprivredni fakultet, Beograd.			
Examination methods			Activities in lectures and exercises _____ 4 points Seminar paper _____ 5 points Two colloquiums of 28 points each _____ 56 points Disease symptom recognition test: 5 points Final exam _____ 30 points A passing grade is obtained if at least 50 points are accumulated Grade and number of points: A (≥ 90 to 100 points); B (≥ 80 to < 90); C (≥ 70 to < 80); D (≥ 60 to < 70); E (≥ 50 to < 60); F < of 50			
Special remarks						
Comment						
Grade:	F	E	D	C	B	A
Number of points	less than 50 points	greater than or equal to 50 points and less than 60 points	greater than or equal to 60 points and less than 70 points	greater than or equal to 70 points and less than 80 points	greater than or equal to 80 points and less than 90 points	greater than or equal to 90 points

Biotechnical Faculty / PLANT PROTECTION / INSECT VECTORS OF PLANT PATHOGENS

Course:	INSECT VECTORS OF PLANT PATHOGENS			
Course ID	Course status	Semester	ECTS credits	Lessons (Lessons+Exercises+Laboratory)
12363	Mandatory	1	4	2+0+1
Programs	PLANT PROTECTION			
Prerequisites	No			
Aims	The aim of the course is that students learn about the most important groups of insects vectors (aphids, cicadas, thrips and others) and the morphology and anatomy of plant pathogen vectors (viruses, phytoplasmas, bacteria, fungi) and to introduce with the control measures that are taken to control insect vectors.			
Learning outcomes	After student passes this exam will be able to: have a knowledge about the vector role of insects and recognize vectors of plant pathogens; recognize and match symptoms of damages with the certain symptom of diseases; acquired knowledge and skills regarding monitoring of vectors of plant pathogens; understands the mechanisms of transmission of plant pathogens by different insect species; knowledge about different ways of transmission plant viruses; knowledge about laboratory methods for identification of various plant pathogens in body of insect vector; application of appropriate control measures in order to prevent the spread of certain diseases			
Lecturer / Teaching assistant	Prof. dr Sanja Radonjić			
Methodology	Lectures, exercises (laboratory and field), independent work, consultations			
Plan and program of work				
Preparing week	Preparation and registration of the semester			
I week lectures	Introduction. Systematics and basic characteristics of vectors of plant pathogens.			
I week exercises	Systematic place of vectors of plant pathogens.			
II week lectures	Aphids - vectors of plant pathogens (viruses).			
II week exercises	Morphological and anatomical characteristics of aphids.			
III week lectures	Whiteflies - vectors of plant pathogens (viruses).			
III week exercises	Morphological and anatomical characteristics of whiteflies.			
IV week lectures	Cicadas and leafhoppers - vectors of plant pathogens (phytoplasmas).			
IV week exercises	Morphological and anatomical characteristics of cicadas and leafhoppers .			
V week lectures	Psyllids - vectors of plant pathogens (phytoplasmas and bacteria)			
V week exercises	Morphological and anatomical characteristics of psyllids.			
VI week lectures	Thrips - vectors of plant pathogens (viruses).			
VI week exercises	Morphological and anatomical characteristics of thrips.			
VII week lectures	Colloquium. Other insects vectors of plant pathogens.			
VII week exercises	Methods of collection and rearing insects vectors in the laboratory.			
VIII week lectures	Correctional colloquium. Other insects vectors of plant pathogens.			
VIII week exercises	Methods of collection and rearing insects vectors in the laboratory.			
IX week lectures	Viruses - plant disease causing agents and heir relationship with insect vectors.			
IX week exercises	Rearing/maintenance of insect vectors in the laboratory.			
X week lectures	Transmission of plant viruses by aphids.			
X week exercises	Maintaining aphids colony in the laboratory and practical work.			
XI week lectures	Transmission of plant viruses by whiteflies and coccids.			
XI week exercises	Maintaining whiteflies colony in the laboratory and practical work			
XII week lectures	Transmission of plant viruses by psyllids and thrips.			
XII week exercises	Maintaining thrips colony in the laboratory and practical work			
XIII week lectures	Biology and epidemiology of phytoplasmas and relationship with insect vectors (transmission).			

XIII week exercises	Introduction with the most important test plants, methods of laboratory transmission of phytoplasmas					
XIV week lectures	Biology and epidemiology of phytoplasmas and relationship with insect vectors (transmission).					
XIV week exercises	Independent work of students in the laboratory.					
XV week lectures	Molecular diagnostics - molecular techniques for diagnosis and identification of harmful organisms.					
XV week exercises	Introduction with the most important methods of molecular diagnostics - laboratory.					
Student workload						
Per week			Per semester			
4 credits x 40/30=5 hours and 20 minuts 2 sat(a) theoretical classes 1 sat(a) practical classes 0 excercises 2 hour(s) i 20 minuts of independent work, including consultations			Classes and final exam: 5 hour(s) i 20 minuts x 16 =85 hour(s) i 20 minuts Necessary preparation before the beginning of the semester (administration, registration, certification): 5 hour(s) i 20 minuts x 2 =10 hour(s) i 40 minuts Total workload for the subject: 4 x 30=120 hour(s) Additional work for exam preparation in the preparing exam period, including taking the remedial exam from 0 to 30 hours (remaining time from the first two items to the total load for the item) 24 hour(s) i 0 minuts Workload structure: 85 hour(s) i 20 minuts (cources), 10 hour(s) i 40 minuts (preparation), 24 hour(s) i 0 minuts (additional work)			
Student obligations			Students are required to attend lecturers, complete all exercises, colloquium and final exam			
Consultations			In agreement with students			
Literature			Printed material. Other literature: 1. Chapman R. F. (1998): The Insects, Structure and Function. Cambridge, University Press.; 2. Blackman, R.L., Eastop, V.F. (2000): Aphids on the worlds crops. An identification guide. A Wiley - interscience publication; 3. Maramorosch, K., Harris, K (1979): Leafhopper Vectors and Plant Disease agents. Academic press, INC. New York; 4. Cravedi, P., Mazzoni, E., Pasqualini, G., Pellizzari, G., Rapisarda, C., Russo, A., Suma, P., Tranfaglia, A. (2008): Psille, cocciniglie e aleirodidi-fruttiferi, agrumi, vite, olivo e otricole. Bayer Crop Science. Edizioni L'Informatore Agrario; 5. Lewis, T. (1997): Thrips as Crop Pests. CABI.			
Examination methods			Activity on lecturers and exerecises - 5 points Colloquium - 30 points Final exam - 65 points Grade: number of points: A (≥ 90 - 100 points); B (≥ 80 - < 90); C (≥ 70 - < 80); D (≥ 60 - < 70); E (≥ 50 . < 60); F < od 50			
Special remarks			No			
Comment						
Grade:	F	E	D	C	B	A
Number of points	less than 50 points	greater than or equal to 50 points and less than 60 points	greater than or equal to 60 points and less than 70 points	greater than or equal to 70 points and less than 80 points	greater than or equal to 80 points and less than 90 points	greater than or equal to 90 points

Biotechnical Faculty / PLANT PRODUCTION / MICROBIOLOGY

Course:	MICROBIOLOGY			
Course ID	Course status	Semester	ECTS credits	Lessons (Lessons+Exercises+Laboratory)
2858	Mandatory	2	5	3+0+1
Programs	PLANT PRODUCTION			
Prerequisites	There is NOT conditionality with other subjects.			
Aims	Introduction to morphology, physiology, ecology and systematics of microorganisms. As well as the role of microorganisms in nature, with special reference to soil microorganisms and phytopathogenic microorganisms that are of special interest to plants and crop production.			
Learning outcomes	After the student passes this exam, he will acquire basic knowledge about: 1. microbiology as a scientific discipline; 2. disciplines of microbiology; 3. different types of microorganisms; 4. morphological, physiological and ecological characteristics of microorganisms; 5. the role and distribution of microorganisms in nature; 6. the method of plant infection and transmission of microorganisms; 7. microbiological laboratories (purpose of laboratory, equipment, apparatus, techniques); 8. Microscopy techniques.			
Lecturer / Teaching assistant	assist. prof. Igor Pajović, PhD			
Methodology	Lectures, exercises, homework, tests, independent work, consultations, colloquiums and final exam.			
Plan and program of work				
Preparing week	Preparation and registration of the semester			
I week lectures	Introduction: subjects, disciplines, importance, historical development of Microbiology			
I week exercises	Overall Microbiology laboratory layout			
II week lectures	Morphology of microorganisms			
II week exercises	Professional positions in a microbiological laboratory			
III week lectures	Ecology of microorganisms			
III week exercises	General and specific instructions for work in microbiological laboratories			
IV week lectures	Colloquium I; Test 1; Physiology of microorganisms (metabolism, ferments, nutrition and respiration)			
IV week exercises	Laboratory equipment and dishes			
V week lectures	Remedial colloquium I; remedial 1st test; Physiology of microorganisms (growth, reproduction, movement and creation of conservation forms)			
V week exercises	Laboratory apparatus			
VI week lectures	Energy groups of microorganisms (special microorganisms)			
VI week exercises	Sterilization and preparation of instruments and materials for sterilization			
VII week lectures	The role and distribution of microorganisms in nature			
VII week exercises	Preparation of microbiological nutrient media			
VIII week lectures	Pathogenicity of microorganisms			
VIII week exercises	Microorganisms cultivation and growth			
IX week lectures	Soil microbiology			
IX week exercises	Isolation of microorganisms cultures			
X week lectures	Colloquium II; Test 2; Variability - Genetics of microorganisms			
X week exercises	Methods of preserving microorganisms cultures			
XI week lectures	Remedial colloquium II; remedial 2nd test; Basic systematics of Archaea			
XI week exercises	Microbiological microscopic preparations			
XII week lectures	Basic systematics of Bacteria			
XII week exercises	Fixed preparations; simple and complex staining			
XIII week lectures	Basic systematics of Fungi			
XIII week exercises	Microscopes			

XIV week lectures	Basic systematics of Algae					
XIV week exercises	Microscopy techniques					
XV week lectures	Basic systematics of Protozoa and non-cellular microorganisms					
XV week exercises	Microscopy techniques					
Student workload						
Per week			Per semester			
5 credits x 40/30=6 hours and 40 minuts 3 sat(a) theoretical classes 1 sat(a) practical classes 0 excercises 2 hour(s) i 40 minuts of independent work, including consultations			Classes and final exam: 6 hour(s) i 40 minuts x 16 =106 hour(s) i 40 minuts Necessary preparation before the beginning of the semester (administration, registration, certification): 6 hour(s) i 40 minuts x 2 =13 hour(s) i 20 minuts Total workload for the subject: 5 x 30=150 hour(s) Additional work for exam preparation in the preparing exam period, including taking the remedial exam from 0 to 30 hours (remaining time from the first two items to the total load for the item) 30 hour(s) i 0 minuts Workload structure: 106 hour(s) i 40 minuts (courses), 13 hour(s) i 20 minuts (preparation), 30 hour(s) i 0 minuts (additional work)			
Student obligations			Attending lectures and exercises, doing homework, tests, colloquiums and exams. If necessary, consultation one school hour during the week.			
Consultations			Consultation 45 minutes during the week.			
Literature			Literature: 1. Mirjana Jarak, Govedarica Mitar (2003): Microbiology, Faculty of Agriculture, Novi Sad; 2. Mirjana Jarak, Simonida Đurić (2006): Practical course in microbiology, Faculty of Agriculture, Novi Sad. Additional literature: 1. Bojanić Rašović Mirjana (2020): Microbiology for students of animal production, University of Montenegro, Podgorica (first part of the book).			
Examination methods			Homework 1 point each = 10 points in total; - 2 tests of 5 points each = 10 points in total; - 2 colloquiums of 15 points each = 30 points in total; - final exam maximum 50 points. Note: homework, tests and colloquiums are mandatory. Grades and points: A (≥ 90 to 100 points); B (≥ 80 to < 90); C (≥ 70 to < 80); D (≥ 60 to < 70); E (≥ 50 to < 60) F < of 50. A passing grade is obtained if at least 50 points are accumulated cumulatively.			
Special remarks						
Comment						
Grade:	F	E	D	C	B	A
Number of points	less than 50 points	greater than or equal to 50 points and less than 60 points	greater than or equal to 60 points and less than 70 points	greater than or equal to 70 points and less than 80 points	greater than or equal to 80 points and less than 90 points	greater than or equal to 90 points

Biotechnical Faculty / TECHNOLOGIES IN ANIMAL HUSBANDRY / MILK PROCESSING TECHNOLOGY

Course:	MILK PROCESSING TECHNOLOGY			
Course ID	Course status	Semester	ECTS credits	Lessons (Lessons+Exercises+Laboratory)
12374	Mandatory	2	6	3+0+2
Programs	TECHNOLOGIES IN ANIMAL HUSBANDRY			
Prerequisites	no conditionality			
Aims	Introducing the student to the technologies of drinking milk, fermented milk drinks, the role of lactic acid bacteria and starter cultures, the technology of cheese production, the technological processes of the production of certain types of cheese, the technologies of different types of cream, butter, ice cream, condensed and dried dairy products, and legal provisions, i.e. . Rulebook on the quality of milk and milk products			
Learning outcomes	Organizes and implements the transport of milk from the farm to the dairy, • Understands and applies the correct procedures for receiving milk on the farm and receiving it in the dairy, technological operations during milk reception: clarification, deaerization, cooling... • Differentiates drinking milk and technological processes in their production, • Describes the most important stages in cheese production (the concept of syneresis, division of cheeses, curdling and types of curdling, basic technological stages in cheese production), • Recognizes, groups and briefly describes cheeses and their technologies (hard and semi-hard cheeses, steamed dough cheeses, white brine cheeses, cheeses with noble molds, fresh cheeses, processed cheeses, whey and whey cheeses), • Groups and briefly describes fermented milk products and their technologies (yogurt, kefir and kumis, sour cream, buttermilk, cream-rind, butter, ice creams), as well as concentrated and dried milk products (condensed unsweetened and sweetened milk, powdered milk, skimmed milk) milk powder, instant milk powder), • Use acquired knowledge in milk processing plants.			
Lecturer / Teaching assistant	prof. dr Slavko Mirecki, mr Olga Kopitović			
Methodology	lectures, exercises (laboratory and computational), seminar work on a given topic, consultations			
Plan and program of work				
Preparing week	Preparation and registration of the semester			
I week lectures	Transport of milk from the farm to the dairy: organization of transport, means of transport, equipment for transporting milk within the dairy			
I week exercises	Introduction to laboratory exercises and methods used for the analysis of milk and milk products.			
II week lectures	Procedures for receiving milk on the farm and reception at the dairy, technological operations during milk reception			
II week exercises	Proper procedures for sampling milk and milk products. laboratory			
III week lectures	Consumable milk: definition, fresh milk, concept and types of pasteurization, concept and types of sterilization, thermalization, recuperation...			
III week exercises	Sampling of milk and milk products for chemical and microbiological analysis. laboratory			
IV week lectures	Technological processes in the production of pasteurized and sterilized milk			
IV week exercises	Preparation of samples and chemical analysis of drinking milk: raw, pasteurized, UHT... (IR spectrophotometry) laboratory			
V week lectures	Colloquium 1			
V week exercises	Adulteration of milk: addition of water and skimming of milk fat (methods of cryoscopy and lactodensimetry)			
VI week lectures	General cheesemaking: definition of cheese, concept of syneresis, division of cheeses, curdling and types of curdling. basic technological stages in cheese production			
VI week exercises	Calculation of the content of dry matter, milk fat in dry matter, water in fat-free substance ... (calculation)			
VII week lectures	Special cheese-making: technology: hard and semi-hard cheeses, steamed dough cheeses, white brine cheeses,			
VII week exercises	Preparation of samples and chemical analysis of hard and semi-hard cheeses, brine cheeses, cheese spreads... (IR spectrophotometry) - laboratory			
VIII week lectures	Special cheesemaking: technology of cheeses with noble molds, fresh cheeses, processed cheeses,			

	whey and whey cheeses.
VIII week exercises	Preparation of samples and chemical analysis of cheeses with noble molds, fresh cheeses, processed cheeses, whey and whey cheeses.
IX week lectures	Colloquium 2
IX week exercises	Classification of cheeses according to Codex Alimentarius and International Dairy Federation criteria
X week lectures	Fermented dairy products. Definition and basic terms. Dairy (starter) cultures. Concept and types of fermentation. Types of fermented products. Technological processes in the production of fermented milk: yogurt, kefir, kumis
X week exercises	Preparation of samples and chemical analysis of fermented milk products: yogurt and kefir (IR spectrophotometry) laboratory
XI week lectures	Sour cream. Technological processes in production: pasteurized sweet and sour cream, sterilized cream, whipped cream (sour cream). Milk desserts, Buttermilk, Kajmak-Skorup..
XI week exercises	Preparation of samples and chemical analysis of sweet and fermented cream, kajmak-skorup (IR spectrophotometry) laboratory
XII week lectures	Butter. Theories of butter creation, technological process of cream production, defects of butter, Butter, Ghee, Anhydrous milk fat...
XII week exercises	Preparation of samples and chemical analysis of dairy products with high milk fat content: butter, processed cheeses... (IR spectrophotometry) laboratory
XIII week lectures	Ice cream. Ice cream categories, specific types of ice cream, ice cream technology, production errors
XIII week exercises	Preparation of samples and chemical analysis of ice cream, milk desserts... (IR spectrophotometry) laboratory
XIV week lectures	Concentrated and dried dairy products. Significance, advantage, nutritional value. Condensed unsweetened and sweetened milk. Powdered milk
XIV week exercises	Visit to dairies: cheeses and fermented milk products
XV week lectures	Sensory evaluation of milk and milk products - theoretical part
XV week exercises	Sensory evaluation of milk and milk products - practical part
Student workload	
Per week	Per semester
6 credits x 40/30=8 hours and 0 minuts 3 sat(a) theoretical classes 2 sat(a) practical classes 0 excercises 3 hour(s) i 0 minuts of independent work, including consultations	Classes and final exam: 8 hour(s) i 0 minuts x 16 =128 hour(s) i 0 minuts Necessary preparation before the beginning of the semester (administration, registration, certification): 8 hour(s) i 0 minuts x 2 =16 hour(s) i 0 minuts Total workload for the subject: 6 x 30=180 hour(s) Additional work for exam preparation in the preparing exam period, including taking the remedial exam from 0 to 30 hours (remaining time from the first two items to the total load for the item) 36 hour(s) i 0 minuts Workload structure: 128 hour(s) i 0 minuts (cources), 16 hour(s) i 0 minuts (preparation), 36 hour(s) i 0 minuts (additional work)
Student obligations	attending exercises, writing a seminar paper, passing colloquiums, passing the final exam
Consultations	45 min. weekly in agreement with students
Literature	Recommended reading: 1. Tratnik, Lj. and Božanić, R, (2012): "Milk and milk products". Croatian Dairy Association. Zagreb 2. Carić, M., Milanović, S., Vucelja, D. (2000): Standard methods of analysis of milk and milk products. Prometheus, Novi Sad. Additional reading: Havranek, J., Kalit, S., Antunac, N., Samaržija, D (2014): "Sirarstvo". HMU. Zagreb
Examination methods	Activity during the lecture (0-4 points) o Exercises Test 1 (0-5 points) 0 Exercises Test 2 (0-5 points) o Seminar work (0-6 points) o I colloquium (0-20 points) o II colloquium (0-20 points) o Final exam (0-40 points) A passing grade is obtained if 50 points are accumulated cumulatively Grade number of points: A (≥ 90 to 100 points); B (≥ 80 to < 90); C (≥ 70 to < 80); D (≥ 60 to < 70); E (≥ 50 to < 60); F < of 50
Special remarks	
Comment	

Grade:	F	E	D	C	B	A
Number of points	less than 50 points	greater than or equal to 50 points and less than 60 points	greater than or equal to 60 points and less than 70 points	greater than or equal to 70 points and less than 80 points	greater than or equal to 80 points and less than 90 points	greater than or equal to 90 points

Biotechnical Faculty / PLANT PROTECTION / NEMATOLOGY

Course:	NEMATOLOGY			
Course ID	Course status	Semester	ECTS credits	Lessons (Lessons+Exercises+Laboratory)
13376	Mandatory	3	5	2+0+2
Programs	PLANT PROTECTION			
Prerequisites	There is NOT conditionality with other subjects.			
Aims	The aim of the lesson is to familiarize students with morphology, anatomy, ecology, relations with vectors and systematics of nematodes; master the skills of recognizing phytoparasitic nematodes and the symptoms of damage they cause, in order to be able to make a decision on the method and time of suppression.			
Learning outcomes	After passing this exam, the student will be able to (1) Understand the morphological and anatomical structure of nematodes; (2) Explain the relationship between nematodes and other living things, especially vectors; (3) Determines the most important phytophagous nematodes; (4) Uses knowledge for the purpose of preventive and curative protection of plants from nematodes; (5) Uses chemical measures when controlling nematodes, "One health" concept.			
Lecturer / Teaching assistant	assist. prof. Igor Pajović, PhD			
Methodology	Lectures, exercises, seminar work, independent student work, consultations, colloquiums and final exam.			
Plan and program of work				
Preparing week	Preparation and registration of the semester			
I week lectures	Introduction to nematology, classification and systematization of nematodes.			
I week exercises	Nematology laboratory and use of dichotomous keys for determination of nematodes.			
II week lectures	Morphology and anatomy of nematodes.			
II week exercises	Microscopy in nematology.			
III week lectures	The relationship between nematodes and other living creatures (parasitism, phytoparasitic, antagonists, hematophagies, predators, virus vectors...); Relationship with vectors; Ecology of nematodes.			
III week exercises	Recognizing the symptoms of nematode attacks on other living beings.			
IV week lectures	Characteristics of the most important groups, orders, families and genera of phytoparasitic nematodes.			
IV week exercises	Differentiation of the most important groups of phytoparasitic nematodes.			
V week lectures	Techniques of working with nematodes in the field, sampling techniques.			
V week exercises	Working with nematodes in the field.			
VI week lectures	Techniques of working with nematodes in the laboratory.			
VI week exercises	Colloquium I			
VII week lectures	Nematodes in fruit growing and viticulture.			
VII week exercises	Remedial colloquium I			
VIII week lectures	Nematodes in crop production.			
VIII week exercises	Sample processing, extraction and elutriation of nematodes.			
IX week lectures	Potato cysts nematodes.			
IX week exercises	Basic differences between nematodes that can be a problem in fruit growing and vineyards.			
X week lectures	Nematodes in vegetable production.			
X week exercises	Basic differences between nematodes that can be a problem in potato production, in agriculture, on forage plants and lawns.			
XI week lectures	Nematodes in objects of protected area I.			
XI week exercises	Basic differences between nematodes that can be a problem in vegetable growing and in protected area facilities.			

XII week lectures	Nematodes in objects of protected area II.					
XII week exercises	Colloquium II					
XIII week lectures	Nematodes of tobacco, ornamental and forest plants.					
XIII week exercises	Remedial colloquium II					
XIV week lectures	Possibilities of controlling phytoparasitic nematodes, non-chemical measures and IMP.					
XIV week exercises	Basic differences between nematodes that can be a problem on tobacco, ornamental and forest plants; Methods of controlling phytoparasitic nematodes.					
XV week lectures	Possibilities of controlling phytoparasitic nematodes, use of nematocides.					
XV week exercises	Defense of the seminar paper.					
Student workload						
Per week			Per semester			
5 credits x 40/30=6 hours and 40 minuts 2 sat(a) theoretical classes 2 sat(a) practical classes 0 excercises 2 hour(s) i 40 minuts of independent work, including consultations			Classes and final exam: 6 hour(s) i 40 minuts x 16 =106 hour(s) i 40 minuts Necessary preparation before the beginning of the semester (administration, registration, certification): 6 hour(s) i 40 minuts x 2 =13 hour(s) i 20 minuts Total workload for the subject: 5 x 30=150 hour(s) Additional work for exam preparation in the preparing exam period, including taking the remedial exam from 0 to 30 hours (remaining time from the first two items to the total load for the item) 30 hour(s) i 0 minuts Workload structure: 106 hour(s) i 40 minuts (cources), 13 hour(s) i 20 minuts (preparation), 30 hour(s) i 0 minuts (additional work)			
Student obligations			Students are required to attend lectures and exercises, do a seminar, do both colloquiums and the final exam. If necessary, consultation one school hour during the week.			
Consultations			Consultation 45 minutes during the week.			
Literature			1. Milan Radivojević (2019). Phytonematology. University of Belgrade, Faculty of Agriculture. 2. Krnjajić Đ. and Krnjajić S. (1987). Phytonematology. 3. Jama N. (1983). Nematofauna of some vegetable crops grown in a protected area. Additional literature: 4. Barker K.B., C.C. Carter and Sasser, J.N. (1985). An Advanced Treatise on Meloidogyne: Volumes I and II. 5. sjacob J.J. and Bezooijen J.V., (1977). A manual for practical work in nematology.			
Examination methods			Seminar paper 10 points; 2 colloquiums of 20 points each (40 points in total); final exam maximum 50 points. If cabinet classes are held, colloquiums are worth 25 points each. Grades and points: A (≥ 90 to 100 points); B (≥ 80 to < 90); C (≥ 70 to < 80); D (≥ 60 to < 70); E (≥ 50 to < 60) F < of 50. A passing grade is obtained if at least 50 points are accumulated cumulatively.			
Special remarks						
Comment						
Grade:	F	E	D	C	B	A
Number of points	less than 50 points	greater than or equal to 50 points and less than 60 points	greater than or equal to 60 points and less than 70 points	greater than or equal to 70 points and less than 80 points	greater than or equal to 80 points and less than 90 points	greater than or equal to 90 points

Biotechnical Faculty / FRUIT GROWING, VITICULTURE AND ENOLOGY / OLIVE GROWING AND OLIVE OIL PRODUCTION

Course:	OLIVE GROWING AND OLIVE OIL PRODUCTION			
Course ID	Course status	Semester	ECTS credits	Lessons (Lessons+Exercises+Laboratory)
12332	Mandatory	1	5	3+0+1
Programs	FRUIT GROWING, VITICULTURE AND ENOLOGY			
Prerequisites	None			
Aims	Acquaint students with the conditions, basic agro and technical measures for modern olive growing; conditions for the production of quality olive oil, evaluation of the quality of olive oil			
Learning outcomes	After passing the exam, the student should: Know the history of olive growing, the distribution and importance of olives in the world and our country; Can describe the ways of growing olives and the basic requirements of olives according to environmental conditions; He can explain the method of raising olive trees and the application of agrotechnical measures, propagation, pruning, the specifics of harvesting; He can use the descriptor to describe varieties feature, to assess the degree of ripeness of the fruit and determine the moment of harvesting; Knows the factors that affect the quality of olive oil, and the olive fruit processing process; It can recognize quality olive oil and distinguish oil with a negative attribute (flaw); Knows the factors that influence and the conditions necessary for the preservation of olive oil; Knows the principle of forming a panel and evaluating the quality of olive oil; He is qualified for teamwork, critical thinking, knowledge presentation and teaching evaluation.			
Lecturer / Teaching assistant	Prof. Dr. Biljana Lazović, Assoc. Dr. Mirjana Adakalić			
Methodology	Lectures, exercises, field exercises, colloquiums, and final exam			
Plan and program of work				
Preparing week	Preparation and registration of the semester			
I week lectures	Botanical affiliation and history of olive cultivation in the world and our country, Biology, and morphology			
I week exercises	Olive morphometrics: tree, leaf, and inflorescence characteristics			
II week lectures	Assortment of olives, the most important varieties grown in the world, Assortment of olives of Montenegro			
II week exercises	Olive morphometrics: fruit and stone characteristics			
III week lectures	Ecological conditions for growing olives, Fertility, Ripening, Specificities of olive propagation			
III week exercises	Agronomic and commercial characteristics of olive varieties			
IV week lectures	Raising new plantings, choosing a place for planting, choosing varieties, planting			
IV week exercises	Olive propagation, vegetative and generative			
V week lectures	Maintenance of plantations; Harvesting of olives, table varieties, and oil varieties Colloquium I			
V week exercises	Olive harvest, determination of ripeness index			
VI week lectures	Olive pruning (cultivation forms, young plantings, productive, regenerative)			
VI week exercises	Olive pruning			
VII week lectures	Olive oil through history, production in the world and our country; Factors affecting quality			
VII week exercises	Test I			
VIII week lectures	The influence of the variety on the quality of olive oil, ripening, harvesting, transport, and storage of the fruit until processing			
VIII week exercises	Oil tasting I			
IX week lectures	Fruit processing: grinding, mixing, phase separation; different systems			
IX week exercises	Determination of oil content in olive fruit			
X week lectures	Oil storage, oil packaging, cleaning, and maintenance of processing facilities			
X week exercises	Marking the quality of olive oil, packaging, and labeling			
XI week lectures	Secondary products of olive processing, Biomass, Composition, and characteristics of olive oil			
XI week exercises	Oil tasting II			

XII week lectures	Analysis and classification of olive oil, quality standards					
XII week exercises	Classification and characteristics of olive oil					
XIII week lectures	Chemical analyses of olive oil (purity, origin), Sensory analysis of olive oil					
XIII week exercises	Test 2					
XIV week lectures	Marketing, market, labeling, protection of origin; Colloquium II					
XIV week exercises	Oil tasting III					
XV week lectures	Olive oil and health, importance in nutrition					
XV week exercises	Tour of olive groves					
Student workload	Weekly 5 credits x 40/30=6 hours and 40 minutes 3 hour(s) of theoretical lectures 1 hour(s) of practical lecture 0 exercises 2 hour(s) and 40 minutes independent work, including consultations During the semester Classes and final exam: 6 hours and 40 minutes x 16 = 106 hours and 40 minutes Necessary preparation before the beginning of the semester (administration, registration, certification): 6 hours and 40 minutes x 2 = 13 hours and 20 minutes Total workload for the course: 5 x 30=150 hours Supplementary work for exam preparation in the remedial exam period, including taking a make-up exam from 0 to 30 hours (remaining time from the first two items to the total load for the subject) 30 hours and 0 minutes Load structure: 106 hours and 40 minutes (teaching), 13 hours and 20 minutes (preparation), 30 hours and 0 minutes (additional work)					
Per week			Per semester			
5 credits x 40/30=6 hours and 40 minutes 3 sat(a) theoretical classes 1 sat(a) practical classes 0 exercises 2 hour(s) i 40 minutes of independent work, including consultations			Classes and final exam: 6 hour(s) i 40 minutes x 16 =106 hour(s) i 40 minutes Necessary preparation before the beginning of the semester (administration, registration, certification): 6 hour(s) i 40 minutes x 2 =13 hour(s) i 20 minutes Total workload for the subject: 5 x 30=150 hour(s) Additional work for exam preparation in the preparing exam period, including taking the remedial exam from 0 to 30 hours (remaining time from the first two items to the total load for the item) 30 hour(s) i 0 minutes Workload structure: 106 hour(s) i 40 minutes (courses), 13 hour(s) i 20 minutes (preparation), 30 hour(s) i 0 minutes (additional work)			
Student obligations			Students are required to attend classes and exercises, do colloquiums, tests, and final exam			
Consultations			In agreement with the students			
Literature			K. Miranović (2006): Maslina, Pobjeda, 1-520, Podgorica; I. Kovačić, S. Perica, (1994): Suvremeno maslinarstvo, Dalmacija papir, 1-114, Split; IOOC (1989): Olive pruning, 1-111, Madrid; Baranco: (2002): El Cultivo del Olivo, Madrid; B. Škarica, I. Žužić, M. Bonifačić (1996): Maslina i maslinovo ulje visoke kakvoće u Hrvatskoj, Tisak; O. Koprivnjak (2006): Djevičansko maslinovo ulje, MIH d.o.o., Poreč			
Examination methods			- Class attendance 5 points - Test: (8+7) 15 points - Colloquium: (2 x 15) 30 points - Final exam: 50 points Grade/number of points A (≥ 90 to 100 points); B (≥ 80 to < 90); C (≥ 70 to < 80); D (≥ 60 to < 70); E (≥ 50 to < 60) F < of 50			
Special remarks			Lectures are conducted in the classroom and on the field. Attendance at exercises is mandatory for passing the exam. Two excused absences from practice are allowed.			
Comment						
Grade:	F	E	D	C	B	A
Number of points	less than 50 points	greater than or equal to 50 points and less than 60 points	greater than or equal to 60 points and less than 70 points	greater than or equal to 70 points and less than 80 points	greater than or equal to 80 points and less than 90 points	greater than or equal to 90 points

Biotechnical Faculty / PLANT PRODUCTION / PHYTOPATOLOGY

Course:	PHYTOPATOLOGY			
Course ID	Course status	Semester	ECTS credits	Lessons (Lessons+Exercises+Laboratory)
4806	Mandatory	5	6	4+0+1
Programs	PLANT PRODUCTION			
Prerequisites	None			
Aims	Aims of the course are to enable students to adopt scientific knowledge about plant diseases - the mechanism of their development, causal agents, and the interaction between causal agent, host plant and the environment, as well as distribution and economic importance of certain plant diseases, symptoms, morphological features of the pathogen, its life cycle, hosts and possible measures to combat pathogens and diseases of cultivated plants			
Learning outcomes	After passing this exam, student will be able to: - differentiate causes of plant diseases - recognize the symptoms of the most important diseases of agricultural crops - describe the basic features of plant pathogens - explain the interaction between causal agent, host plant and the environment - explain the most important fungal, bacterial and virus diseases of cultivated plants and their agents, the life cycle and transmission - indicate the control measures that can be applied in combating the most important agricultural plant pathogens			
Lecturer / Teaching assistant	Full Professor Jelena Latinović, PhD - teacher, Bogoljub Kandić, MSc - assistant			
Methodology	Lectures, Exercises, Individual work, Consultations, Colloquiums and Final exam			
Plan and program of work				
Preparing week	Preparation and registration of the semester			
I week lectures	Introduction, importance and causal agents of plant diseases			
I week exercises	Introduction with the work in plant pathology lab - equipment			
II week lectures	Non-parasitic diseases, Parasitic diseases			
II week exercises	Introduction with the work in plant pathology lab - laboratory accessories and glassware, nutrient media			
III week lectures	Basic characteristics of plant diseases causal agents			
III week exercises	Introduction with the work in plant pathology lab - microscope and microscopy			
IV week lectures	Symptomatology, Pathogenesis			
IV week exercises	Recognizing the symptoms of diseased plants			
V week lectures	Epidemiology, colloquium I			
V week exercises	Recognizing the symptoms of diseased plants			
VI week lectures	Plant resistance to diseases, Basic control measures, correctional colloquium I			
VI week exercises	Examination of herbarized plant material			
VII week lectures	Mycosis: Fungi classification, Kingdom Protozoa, Kingdom Chromista			
VII week exercises	Examination of herbarized plant material and microscopy			
VIII week lectures	Kingdom Fungi: Phylum Chytridiomycota, Phylum Ascomycota (Archiascomycetes and Erysiphales			
VIII week exercises	Laboratory exercises: microscopy			
IX week lectures	Kingdom Fungi: Phylum Ascomycota (Pyrenomycetes, Loculoascomycetes			
IX week exercises	Laboratory exercises: microscopy			
X week lectures	Kingdom Fungi: Phylum Ascomycota (Discomycetes), colloquium II			
X week exercises	Laboratory exercises: microscopy			
XI week lectures	Kingdom Fungi: Fungi imperfecti, correctional colloquium II			
XI week exercises	Laboratory exercises: microscopy			
XII week lectures	Kingdom Fungi: Fungi imperfecti			
XII week exercises	Field exercises			

XIII week lectures	Kingdom Fungi: Phylum Basidiomycota					
XIII week exercises	Samples processing and microscopy					
XIV week lectures	Bacterial diseases of plants, Parasitic plants					
XIV week exercises	Basic methods in identification of plant pathogenic bacteria					
XV week lectures	Viral diseases of plants					
XV week exercises	Basic methods in identification of plant pathogenic viruses					
Student workload	weekly 7 credits x 40/30 = 9 hours and 20 minutes Structure: 4 hours of lectures 2 hours of exercises 3 hours and 20 minutes of individual work, including consultations During the semester Teaching and the final exam: (9 hours and 20 minutes) x16 = 149 hours and 20 minutes Necessary preparation before the semester (administration, enrollment and verification): 2 x (9 hours and 20 minutes) = 18 hours and 40 minutes Total workload for the course: 7 x 30 = 210 hours Additional work to prepare the corrective final exam, including the exam taking 0 to 42 hours Structure of workload: 149 hours and 20 minutes (lectures) + 18 hours and 40 minutes (preparation) + 42 hours (additional work)					
Per week			Per semester			
6 credits x 40/30=8 hours and 0 minuts 4 sat(a) theoretical classes 1 sat(a) practical classes 0 excercises 3 hour(s) i 0 minuts of independent work, including consultations			Classes and final exam: 8 hour(s) i 0 minuts x 16 =128 hour(s) i 0 minuts Necessary preparation before the beginning of the semester (administration, registration, certification): 8 hour(s) i 0 minuts x 2 =16 hour(s) i 0 minuts Total workload for the subject: 6 x 30=180 hour(s) Additional work for exam preparation in the preparing exam period, including taking the remedial exam from 0 to 30 hours (remaining time from the first two items to the total load for the item) 36 hour(s) i 0 minuts Workload structure: 128 hour(s) i 0 minuts (cources), 16 hour(s) i 0 minuts (preparation), 36 hour(s) i 0 minuts (additional work)			
Student obligations			Students are required to attend classes, as to accomplish all laboratory and field exercises, seminar work, both colloquiums and final exam			
Consultations						
Literature			Agrios, G.N. (1997): Plant Pathology. Academic Press, USA.			
Examination methods			Activity on lecturers and exercises _____ 5 points Seminar work _____ 5 points Two colloquiums, 28 points each _____ (56 points in total) Final exam _____ 34 points (28 points test + symptoms recognition)			
Special remarks						
Comment						
Grade:	F	E	D	C	B	A
Number of points	less than 50 points	greater than or equal to 50 points and less than 60 points	greater than or equal to 60 points and less than 70 points	greater than or equal to 70 points and less than 80 points	greater than or equal to 80 points and less than 90 points	greater than or equal to 90 points

Biotechnical Faculty / FIELD AND VEGETABLE CROPS / PLANT GENETIC RESOURCES

Course:	PLANT GENETIC RESOURCES			
Course ID	Course status	Semester	ECTS credits	Lessons (Lessons+Exercises+Laboratory)
12354	Mandatory	2	4	3+1+0
Programs	FIELD AND VEGETABLE CROPS			
Prerequisites	There are no prerequisites for registering and taking courses			
Aims	The course aims to provide knowledge about the importance of biodiversity, i.e. agrobiodiversity as its most important component, as well as to acquaint students with the possibility and need for the preservation and sustainable use of plant genetic resources for food and agriculture			
Learning outcomes	After successfully mastering the course, students will be able to: - recognize the importance of biodiversity and the potential that Montenegro has in this area - understand the impact of agricultural production on biodiversity - apply knowledge in the management, access and sustainable use of plant genetic resources - understand the functioning system of the plant gene bank - contribute to strengthening public awareness of the importance of plant genetic resources - contribute to the preservation and sustainable use of plant genetic resources			
Lecturer / Teaching assistant	Dr Zoran Jovović, full professor Dr Ana Velimirović			
Methodology	Lectures, exercises, laboratory exercises, field practice, seminar papers, consultations, etc.			
Plan and program of work				
Preparing week	Preparation and registration of the semester			
I week lectures	Introductory remarks; Biodiversity; The importance of agrobiodiversity			
I week exercises	Inventory and collection of plant genetic resources			
II week lectures	Basic data on the agriculture of Montenegro			
II week exercises	Conservation of collected plant material			
III week lectures	The state of plant genetic resources in Montenegro; Existing collections			
III week exercises	Regeneration of deposited plant material			
IV week lectures	Legal regulations and other relevant documents that treat this area			
IV week exercises	Laboratory exercises			
V week lectures	Program for the conservation of plant genetic resources in agriculture			
V week exercises	Laboratory exercises			
VI week lectures	Inventory and collection of plant genetic resources			
VI week exercises	Laboratory exercises			
VII week lectures	Passport data			
VII week exercises	TEST 1			
VIII week lectures	Plant Gene Bank			
VIII week exercises	Characterization and evaluation of samples			
IX week lectures	In situ conservation			
IX week exercises	Assessment of agronomic properties			
X week lectures	On farm conservation			
X week exercises	Montenegrin plant gene bank - system of functioning			
XI week lectures	Ex situ conservation			
XI week exercises	Field plant gene collections			
XII week lectures	Characterization and evaluation accessed using modern methods; Descriptors			
XII week exercises	On farm conservation			
XIII week lectures	Information and documentation system, Database			
XIII week exercises	Documentation			

XIV week lectures	Sustainable use of genetic resources for food and agriculture					
XIV week exercises	Database					
XV week lectures	Strengthening public awareness of the importance of preserving agrobiodiversity; National and international organizations involved in conservation and sustainable use of genetic resources for food and agriculture					
XV week exercises	TEST 2					
Student workload	Weekly 4 credits x 40/30 = 5 hours and 30 min Structure: 3 hours of lectures, 1 hour of exercises and 1 hour and 30 min of independent work including consultations Lectures and final exam: 5 hours and 30 minutes x 15 = 82 hours and 30 minutes Necessary preparation: 2 x 5 hours and 30 minutes = 11 hours Total hours for the course: 4 x 30 = 120 hours Additional work: 24 hours Structure: 82 hours and 30 minutes (lectures) + 11 hours (preparation) + 24 hours (additional work)					
Per week			Per semester			
4 credits x 40/30=5 hours and 20 minuts 3 sat(a) theoretical classes 0 sat(a) practical classes 1 excercises 1 hour(s) i 20 minuts of independent work, including consultations			Classes and final exam: 5 hour(s) i 20 minuts x 16 =85 hour(s) i 20 minuts Necessary preparation before the beginning of the semester (administration, registration, certification): 5 hour(s) i 20 minuts x 2 =10 hour(s) i 40 minuts Total workload for the subject: 4 x 30=120 hour(s) Additional work for exam preparation in the preparing exam period, including taking the remedial exam from 0 to 30 hours (remaining time from the first two items to the total load for the item) 24 hour(s) i 0 minuts Workload structure: 85 hour(s) i 20 minuts (cources), 10 hour(s) i 40 minuts (preparation), 24 hour(s) i 0 minuts (additional work)			
Student obligations			Students are required to attend classes, field and laboratory exercises and all other planned activities and to actively participate in the preparation of tasks set within the group			
Consultations			Students will be provided with regular weekly consultations			
Literature			Basic literature: - M. Penčić (2005): Biljni genetički resursi (izabrani radovi), Beograd - R.K. Salgotra, B.B. Gupta (2015): Plant Genetic Resources and Traditional Knowledge for Food Security. Springer. - Z. Jovović, D. Stešević, V. Meglič, P. Dolničar (2013): Old potato varieties in Montenegro. Monograph, University of Montenegro, Biotechnical faculty Podgorica - FAO (2012): Conservation and sustainable use under the International treaty, Rome - FAO (2010): The second report on The state of the worlds plant genetic resources for food and agriculture, Rome Additional literature: - Nacionalni program očuvanja i održivog korišćenja genetičkih resursa u poljoprivredi (2008-2013), Vlada Crne Gore - Akcioni plan očuvanja genetičkih resursa u poljoprivredi (2009-2013), Vlada Crne Gore - N. Maxted, M. Ehsan Dulloo, B.V. Ford-Lloyd, L. Frese, J. Irionado, M.A.A. Pinheirode Carvalho (2011): Agrobiodiversity conservation, securing the diversity of crop wild relatives and landraces, CABI, UK, CABI, USA - L. Glowaka, F. Burhenne-Guilmin, H. Synge (1994): A guide to the convention on biological diversity, IUCN, Gland, Switzerland and Cambridge, UK			
Examination methods			- Attendance at lectures 5 points - Test 7 points - Seminar 8 points - Two colloquiums of 20 points each, a total of 40 points - Final exam 40 points A passing grade is obtained if at least 50 points are accumulated Grade A B C D E No of points 90-100 80-89 70-79 60-69 50-59			
Special remarks						
Comment						
Grade:	F	E	D	C	B	A
Number of points	less than 50 points	greater than or equal to 50 points and less than 60 points	greater than or equal to 60 points and less than 70 points	greater than or equal to 70 points and less than 80 points	greater than or equal to 80 points and less than 90 points	greater than or equal to 90 points

Biotechnical Faculty / CONTINENTAL FRUIT GROWING AND MEDICAL PLANTS / PLANT PROTECTION PRODUCTS IN CONTINE.FRUIT GROWING

Course:	PLANT PROTECTION PRODUCTS IN CONTINE.FRUIT GROWING			
Course ID	Course status	Semester	ECTS credits	Lessons (Lessons+Exercises+Laboratory)
8408	Mandatory	5	4	2+0+1
Programs	CONTINENTAL FRUIT GROWING AND MEDICAL PLANTS			
Prerequisites	There is NOT conditionality with other subjects.			
Aims	Acquaintance of students with basic terms about pesticides with a special reference to plant protection products; acquisition of knowledge related to their application; behavior in the external environment and legal bases that regulate the circulation of plant protection products. The aim of studying the course is to get acquainted with the active substances that are on the list of those allowed for use in continental fruit growing. In addition to the above, students learn about the application of personal and collective protection when working with plant protection products.			
Learning outcomes	After the student passes this exam, he will be able to: 1. Define the areas of application of pesticides with special reference to plant protection products; 2. Knows the basic properties of pesticides and their mechanism of action; 3. Knows all basic groups and active substances of fungicides, insecticides and herbicides used in continental fruit growing; 4. Organizes the application of means for plant protection in order to suppress harmful organisms in continental fruit growing; 5. Interprets basic laws and regulations in the field of plant protection products in Montenegro and implements measures to protect people and the environment.			
Lecturer / Teaching assistant	assist. prof. Igor Pajović, PhD			
Methodology	Lectures, exercises, seminar work, independent student work, consultations, colloquiums and final exam.			
Plan and program of work				
Preparing week	Preparation and registration of the semester			
I week lectures	Introduction, pesticides, areas of application of plant protection products.			
I week exercises	Classification and nomenclature of plant protection products.			
II week lectures	Physical and chemical properties of plant protection agents.			
II week exercises	Types of formulations of plant protection products.			
III week lectures	Mechanism of action and formulation of plant protection agents.			
III week exercises	Specificities of pesticide formulations for special purposes (1).			
IV week lectures	Colloquium I			
IV week exercises	Specificities of pesticide formulations for special purposes (2).			
V week lectures	Fungicides (1) in continental fruit growing. Remedial colloquium I			
V week exercises	The legal framework that regulates the use of plant protection products.			
VI week lectures	Fungicides (2) and bactericides in continental fruit growing.			
VI week exercises	Applications of products for plant protection.			
VII week lectures	Zoocides (1) in continental fruit growing.			
VII week exercises	Means for plant protection in organic agriculture.			
VIII week lectures	Zoocides (2) in continental fruit growing.			
VIII week exercises	Integrated Plant Protection (IPM), part one.			
IX week lectures	Herbicides (1) in continental fruit growing.			
IX week exercises	Integrated Plant Protection (IPM), part two.			
X week lectures	Herbicides (2) in continental fruit growing.			
X week exercises	Bees and pesticides			
XI week lectures	Colloquium II			
XI week exercises	Toxicology of plant protection products.			

XII week lectures	Apple fruit protection. Remedial colloquium II.					
XII week exercises	Action in incident situations, regulation of waste caused by the use of pesticides (1).					
XIII week lectures	Protection of plums and similar fruits.					
XIII week exercises	Procedure in incident situations, regulation of waste caused by the use of pesticides (2).					
XIV week lectures	Protection of berries.					
XIV week exercises	Consequences of applying plant protection products, waiting period, first aid.					
XV week lectures	Protection of nut fruits.					
XV week exercises	Correct application of plant protection products.					
Student workload						
Per week			Per semester			
4 credits x 40/30=5 hours and 20 minuts 2 sat(a) theoretical classes 1 sat(a) practical classes 0 excercises 2 hour(s) i 20 minuts of independent work, including consultations			Classes and final exam: 5 hour(s) i 20 minuts x 16 =85 hour(s) i 20 minuts Necessary preparation before the beginning of the semester (administration, registration, certification): 5 hour(s) i 20 minuts x 2 =10 hour(s) i 40 minuts Total workload for the subject: 4 x 30=120 hour(s) Additional work for exam preparation in the preparing exam period, including taking the remedial exam from 0 to 30 hours (remaining time from the first two items to the total load for the item) 24 hour(s) i 0 minuts Workload structure: 85 hour(s) i 20 minuts (cources), 10 hour(s) i 40 minuts (preparation), 24 hour(s) i 0 minuts (additional work)			
Student obligations			Students are required to attend lectures and exercises, do and defend a seminar paper, pass both colloquiums and the final exam. If necessary, consultation one school hour during the week.			
Consultations			Consultation 45 minutes during the week.			
Literature			Literature: (1) Šovljanski R., Lazić S. (2007): Basics of phytopharmacy, Faculty of Agriculture, Novi Sad; (2) Janjić, V., Elezović, I. (2010): Pesticides in agriculture and forestry in Serbia. Society for Plant Protection of Serbia, Belgrade; (3) Vitorović, S., Milošević, M. (2002): Basics of toxicology with elements of ecotoxicology. Faculty of Agriculture. Belgrade-Zemun; (4) Čengiċ-Džomba, S. et al. (2014): Organic production. University of Montenegro, Biotechnical Faculty, Podgorica.			
Examination methods			Writing a seminar paper 5 points; defense of the seminar paper 5 points; 2 colloquiums of 20 points each (40 points in total); final exam maximum 50 points. Note: preparation and defense of the seminar paper are mandatory. A passing grade is obtained if at least 50 points are accumulated cumulatively. Grade - Number of points: A (≥ 90 to 100 points); B (≥ 80 to < 90); C (≥ 70 to < 80); D (≥ 60 to < 70); E (≥ 50 to < 60) F < of 50.			
Special remarks						
Comment						
Grade:	F	E	D	C	B	A
Number of points	less than 50 points	greater than or equal to 50 points and less than 60 points	greater than or equal to 60 points and less than 70 points	greater than or equal to 70 points and less than 80 points	greater than or equal to 80 points and less than 90 points	greater than or equal to 90 points

Biotechnical Faculty / PLANT PROTECTION / PLANT PROTECTION PRODUCTS

Course:	PLANT PROTECTION PRODUCTS			
Course ID	Course status	Semester	ECTS credits	Lessons (Lessons+Exercises+Laboratory)
12355	Mandatory	2	6	3+0+2
Programs	PLANT PROTECTION			
Prerequisites	None			
Aims	Introducing students to the areas of pesticides application and use of active substances in agricultural production and communal hygiene. During the lecture, chemical groups of pesticides with active substances, their mechanism of action and application will be discussed, with special emphasis on pesticides used in agriculture (plant protection products).			
Learning outcomes	After passing the exam, the student will acquire knowledge that allows him to: • Present the most important areas of pesticide application with special reference to plant protection products • Select pesticides for application in non-agricultural areas • Describe all chemical groups of plant protection products and active substances that are in these groups • Apply all active substances in order to control harmful organisms in agriculture			
Lecturer / Teaching assistant	Prof, dr Nedeljko Latinović Mr Bogoljub Kandić			
Methodology	Lectures, Laboratory practice, Field work, Seminars			
Plan and program of work				
Preparing week	Preparation and registration of the semester			
I week lectures	Introduction, areas of pesticide application			
I week exercises	Introduction to application of pesticides			
II week lectures	Pesticides - biocides			
II week exercises	Application of pesticides in communal hygiene			
III week lectures	Pesticides - biocides; fungicides			
III week exercises	Laboratory exercises: fungicides			
IV week lectures	Fungicides			
IV week exercises	Laboratory exercises: fungicides, bactericides			
V week lectures	Fungicides, bactericides			
V week exercises	Laboratory exercises: bactericides			
VI week lectures	Insecticides			
VI week exercises	Laboratory exercises: Insecticides			
VII week lectures	Insecticides			
VII week exercises	Laboratory exercises: insecticides			
VIII week lectures	Insecticides, nematocides			
VIII week exercises	Laboratory exercises: Insecticides, nematocides			
IX week lectures	Nematocides, molluscicides, repellents			
IX week exercises	Field practice			
X week lectures	Rodenticides			
X week exercises	Field practice			
XI week lectures	Rodenticides, herbicides			
XI week exercises	Laboratory exercises: herbicides			
XII week lectures	Herbicides			
XII week exercises	Laboratory exercises: herbicides			
XIII week lectures	Herbicides			
XIII week exercises	Field practice			

XIV week lectures	Arboricides, desiccants, growth regulators					
XIV week exercises	Field practice					
XV week lectures	Pesticide application					
XV week exercises	Calculation of dose and concentration of various plant protection products					
Student workload						
Per week			Per semester			
6 credits x 40/30=8 hours and 0 minuts 3 sat(a) theoretical classes 2 sat(a) practical classes 0 excercises 3 hour(s) i 0 minuts of independent work, including consultations			Classes and final exam: 8 hour(s) i 0 minuts x 16 =128 hour(s) i 0 minuts Necessary preparation before the beginning of the semester (administration, registration, certification): 8 hour(s) i 0 minuts x 2 =16 hour(s) i 0 minuts Total workload for the subject: 6 x 30=180 hour(s) Additional work for exam preparation in the preparing exam period, including taking the remedial exam from 0 to 30 hours (remaining time from the first two items to the total load for the item) 36 hour(s) i 0 minuts Workload structure: 128 hour(s) i 0 minuts (cources), 16 hour(s) i 0 minuts (preparation), 36 hour(s) i 0 minuts (additional work)			
Student obligations			Students are required to attend classes, do seminar work, do all laboratory and field exercises and do both colloquiums.			
Consultations			After the lectures			
Literature			MacBean, C. (2012): The Pesticide Manual: A World Compendium. British Crop Protection Council; Material from Internet; Lectures presentation.			
Examination methods			Activities in lectures and exercises: 5 points Seminar paper: 5 points Two colloquia: 40 points Final exam: 50 points			
Special remarks						
Comment						
Grade:	F	E	D	C	B	A
Number of points	less than 50 points	greater than or equal to 50 points and less than 60 points	greater than or equal to 60 points and less than 70 points	greater than or equal to 70 points and less than 80 points	greater than or equal to 80 points and less than 90 points	greater than or equal to 90 points

Biotechnical Faculty / PLANT PROTECTION / URBAN ZOOLOGY

Course:	URBAN ZOOLOGY			
Course ID	Course status	Semester	ECTS credits	Lessons (Lessons+Exercises+Laboratory)
12361	Mandatory	1	4	2+1+1
Programs	PLANT PROTECTION			
Prerequisites	There is NOT conditionality with other subjects.			
Aims	Introducing students to the basics of zoology in urban areas. Training students to assess the state of the diversity of animal species in urban areas, their impact on people and domestic animals. Review of the anthropogenic impact on urban populations of various animal species in order to enable students to make decisions about the way and time of their suppression using pesticide and non-pesticide pest control measures.			
Learning outcomes	After passing this exam, the student will be able to: 1. Use theoretical and practical knowledge of zoology in urban areas; 2. Evaluates the interactive impact of the anthropogenic factor on the populations of different animal species; 3. Consider the risk on humans and domestic animals health from vector species; 4. Use biocides and pesticides against vector species in communal, medical and veterinary hygiene; 5. Uses acquired knowledge in order to protect the environment and 6. applies the "One health" concept.			
Lecturer / Teaching assistant	assist. prof. Igor Pajović, PhD			
Methodology	Lectures, exercises, independent work, consultations, colloquiums and final exam.			
Plan and program of work				
Preparing week	Preparation and registration of the semester			
I week lectures	Introduction to Urban Zoology.			
I week exercises	Differences between urban, semi-urban and rural areas.			
II week lectures	Concept and characteristics of urban habitats.			
II week exercises	Anthropogenic influence on pests in urbanism and semi-urban areas.			
III week lectures	Characteristics of animal populations in urban habitats.			
III week exercises	Recognizing, locating and eliminating pest breeding sites, especially vectors, in urban habitats.			
IV week lectures	Causes and consequences of the settlement of urban habitats by different animal species important in communal, medical and veterinary hygiene.			
IV week exercises	Recognizing the problems caused by overpopulation of species important in communal, medical and veterinary hygiene.			
V week lectures	Vector species and their relationship to humans and other organisms.			
V week exercises	Identification of Arthropoda vector species.			
VI week lectures	Animals of importance in urban habitats from the groups Protozoa, Plathelminthes, Nematodes and Annelida.			
VI week exercises	Colloquium I			
VII week lectures	Animals of importance in urban habitats from the group Arthropoda Part I – Mosquitoes (Aedes; Anopheles; Culex).			
VII week exercises	Remedial colloquium I			
VIII week lectures	Animals of importance in urban habitats from the groups Arthropoda Part II (Phlebotominae; Simuliidae; Ceratopogonidae Culicoides; Pediculidae; Siphonaptera; Heteroptera Reduviidae) and Mollusca.			
VIII week exercises	Identification of non-vector Arthropoda.			
IX week lectures	Animals of importance in urban habitats from the groups Arthropoda Part III (Acarina Ixodidae, Argasidae and all other arthropods problematic in the urban environment); Pisces; Amphibia; Reptilia and Aves.			
IX week exercises	Identification of vector species other than Arthropoda.			
X week lectures	Animals of importance in urban habitats - wood pests.			
X week exercises	Identification of non-vector species other than Arthropoda.			

XI week lectures	Animals of importance in urban habitats from the group Mammalia.					
XI week exercises	Colloquium II					
XII week lectures	Monitoring of pests, vectors and protected species in urban areas.					
XII week exercises	Remedial colloquium II					
XIII week lectures	Invasive species of vectors that can potentially occur in Montenegro.					
XIII week exercises	Identification of embedded wood pests.					
XIV week lectures	Possibilities of non-pesticide control of potential pest organisms and vectors.					
XIV week exercises	Examples of application of IPM tactics in communal, medical and veterinary hygiene and DDD services.					
XV week lectures	Use of biocides and pesticides in communal, medical and veterinary hygiene.					
XV week exercises	Examples of application of innovative application methods in the DDD service.					
Student workload						
Per week			Per semester			
4 credits x 40/30=5 hours and 20 minuts 2 sat(a) theoretical classes 1 sat(a) practical classes 1 exercises 1 hour(s) i 20 minuts of independent work, including consultations			Classes and final exam: 5 hour(s) i 20 minuts x 16 =85 hour(s) i 20 minuts Necessary preparation before the beginning of the semester (administration, registration, certification): 5 hour(s) i 20 minuts x 2 =10 hour(s) i 40 minuts Total workload for the subject: 4 x 30=120 hour(s) Additional work for exam preparation in the preparing exam period, including taking the remedial exam from 0 to 30 hours (remaining time from the first two items to the total load for the item) 24 hour(s) i 0 minuts Workload structure: 85 hour(s) i 20 minuts (courses), 10 hour(s) i 40 minuts (preparation), 24 hour(s) i 0 minuts (additional work)			
Student obligations			Students are required to attend lectures and exercises, do both colloquiums and the final exam. If necessary, consultation one school hour during the week.			
Consultations			Consultation 45 minutes during the week.			
Literature			(1) Robinson W.H. (2005): Urban Insects and Arachnids: A Handbook of Urban Entomology. Cambridge University Press. (2) Bonnefoy X., Kampen H., Sweeney K. (2008): Public Health Significance of Urban Pests. World Health Organization. Additional literature: (3) Hickman, Jr. C.P., Roberts, L.S., Keen, S.L., Larson, A., IAnson, H., Eisenhour, D.J. (2008): Integrated Principles of Zoology, 14th Ed. McGraw-Hill, New York, USA. (4) Rajković D. and Kostić D. (1995): Practicum in agricultural zoology. University of Novi Sad, Faculty of Science, Institute of Biology, Novi Sad.			
Examination methods			Attendance continues 10 points; - 2 colloquiums of 20 points each = 40 points in total; - final exam maximum 50 points. If cabinet classes are held, colloquiums are worth 25 points each. Grades and points: A (≥ 90 to 100 points); B (≥ 80 to < 90); C (≥ 70 to < 80); D (≥ 60 to < 70); E (≥ 50 to < 60) F < of 50. A passing grade is obtained if at least 50 points are accumulated cumulatively.			
Special remarks						
Comment						
Grade:	F	E	D	C	B	A
Number of points	less than 50 points	greater than or equal to 50 points and less than 60 points	greater than or equal to 60 points and less than 70 points	greater than or equal to 70 points and less than 80 points	greater than or equal to 80 points and less than 90 points	greater than or equal to 90 points

Biotechnical Faculty / PLANT PRODUCTION / WINE PRODUCTION

Course:	WINE PRODUCTION			
Course ID	Course status	Semester	ECTS credits	Lessons (Lessons+Exercises+Laboratory)
6106	Mandatory	6	4	2+0+1
Programs	PLANT PRODUCTION			
Prerequisites	No			
Aims	They acquire knowledge about: the chemical composition of must and wine; procedures of primary processing of grapes and must; process of fermentation, care and finishing of wine, stabilization, bottling wine; production of procedures special wines, and determining the quality of wine by examining the chemical and sensory composition.			
Learning outcomes	After taking this course, students will be familiar with: Wine culture (wine regions, types and categories of wine, etc.); Analyses of the parameters of mechanical composition of grapes and chemical composition of must; Analyses of the fermentation process; Organizing the technological procedure for the production of red and white wines; Organizing the technological procedure during the care, storage and aging of wine; Analyses sensory properties of wine; - Recognize the basic faults and spoilage of wine; - Analyses the chemical properties of wine in oenological laboratories.			
Lecturer / Teaching assistant	Prof dr Radmila Pajović-Šćepanović			
Methodology	Lectures, practice in the oenology laboratory, visits to wineries, consultations, seminar work, colloquiums and final exam.			
Plan and program of work				
Preparing week	Preparation and registration of the semester			
I week lectures	Introducing students to the course and importance of wine culture;			
I week exercises	Introducing students to the methodology of working in oenological laboratory.			
II week lectures	The history of wine making; Introducing with the major wine-growing regions and wine countries in the world;			
II week exercises	Visit to the winery of Biotechnical faculty for introducing with technological process of wine production;			
III week lectures	Characteristics of grapes as base for wine production; Mechanical and chemical composition of grapes;			
III week exercises	Analysis of the mechanical composition of grapes;			
IV week lectures	Grapes ripening and harvesting; Primary processing of grapes;			
IV week exercises	Analyses of chemical composition of must (density and content of sugar);			
V week lectures	Vinification; Alcoholic fermentation; The strains of wine yeasts;			
V week exercises	Analyses of acidity must and wine (total acidity and pH);			
VI week lectures	Colloquium I; The application of SO ₂ in wine production;			
VI week exercises	Analyses of total and free SO ₂ in wine;			
VII week lectures	The technology of white wine production;			
VII week exercises	Analyses of wine density and content of alcohol - fast methods;			
VIII week lectures	Technology of producing red and rose wine;			
VIII week exercises	Analysis of density of wine and alcohol content, using a distillation apparatus and hydrostatic balance;			
IX week lectures	Maturation, care and storage of the wine; Technological procedures and operations and equipment;			
IX week exercises	Determining the extract content in wine by calculation and using a hydrostatic balance;			
X week lectures	Visit to winery "13 Jul Plantaze" for introducing with technological procedures, operations of finalization wine and equipment;			
X week exercises	Visit to winery "13 Jul Plantaze" for introducing with technological procedures, operations of finalization wine and equipment;			
XI week lectures	Spoilage and defects of wine; Preventing the emergence of these processes in wine;			
XI week exercises	Analysis of volatile acids in wine (fast method and method using a distillation apparatus);			

XII week lectures	Special vinification. Process of production of liqueurs, sparkling and carbonated wines;					
XII week exercises	Analysis of residual sugar in wine;					
XIII week lectures	Colloquium II;					
XIII week exercises	Sensory analysis; Basic spoilage and defects of wine;					
XIV week lectures	Evaluating the quality of wine; Sensory evaluations and analysis of chemical composition;					
XIV week exercises	Methods of sensory evaluation of wine: OIV and Bux-Baum;					
XV week lectures	Protection of the controlled origin wine and labeling of the wine; Marketing of wine;					
XV week exercises	Interpretation of wine chemical analysis data;					
Student workload						
Per week			Per semester			
4 credits x 40/30=5 hours and 20 minuts 2 sat(a) theoretical classes 1 sat(a) practical classes 0 excercises 2 hour(s) i 20 minuts of independent work, including consultations			Classes and final exam: 5 hour(s) i 20 minuts x 16 =85 hour(s) i 20 minuts Necessary preparation before the beginning of the semester (administration, registration, certification): 5 hour(s) i 20 minuts x 2 =10 hour(s) i 40 minuts Total workload for the subject: 4 x 30=120 hour(s) Additional work for exam preparation in the preparing exam period, including taking the remedial exam from 0 to 30 hours (remaining time from the first two items to the total load for the item) 24 hour(s) i 0 minuts Workload structure: 85 hour(s) i 20 minuts (cources), 10 hour(s) i 40 minuts (preparation), 24 hour(s) i 0 minuts (additional work)			
Student obligations			Students are required to attend classes, do laboratory analyses, do both colloquiums, seminar and the final exam.			
Consultations						
Literature			1. Radovanović, V. (1986): Tehnologija vina, Građevinska knjiga, Beograd. 2. Daničić, M. (1988): Tehnologija vina - Praktikum, Poljoprivredni fakultet Beograd - Zemun. 3. Stanka Herjavec (2000) Skripta -Tehnologija vina, Agronomski fakultet, Zagreb. 4. C. Flanzky(1998). Oenologie. Fondements scientifiques et technologiques Tech.& Doc./Lavoisier, Paris., 5. P. RibereauGayon et al (2000)., Handbook of enology, Vo1 2. The Chemistry and wine stabilization and treatments, Chapman&Hall; Dunod, Paris. 6. B. W. Zoecklein, K. C. Fugelsang, B. H. Gump, F. S. Nury, Wine Analysis and Production, The Chapman-Hall Enology Library, June 1995			
Examination methods			Activities in lectures and exercises 5 points; Seminar 5 points (orally); Two colloquiums of 20 points each; Final exam 50 points. Ratings and points: A (≥ 90 to 100 points); B (≥ 80 to < 90); C (≥ 70 to < 80); D (≥ 60 to < 70); E (≥ 50 to < 60) F < of 50.			
Special remarks						
Comment						
Grade:	F	E	D	C	B	A
Number of points	less than 50 points	greater than or equal to 50 points and less than 60 points	greater than or equal to 60 points and less than 70 points	greater than or equal to 70 points and less than 80 points	greater than or equal to 80 points and less than 90 points	greater than or equal to 90 points

Biotechnical Faculty / FRUIT GROWING, VITICULTURE AND ENOLOGY / WINE QUALITY AND STORAGE

Course:	WINE QUALITY AND STORAGE			
Course ID	Course status	Semester	ECTS credits	Lessons (Lessons+Exercises+Laboratory)
12337	Mandatory	2	5	3+0+2
Programs	FRUIT GROWING, VITICULTURE AND ENOLOGY			
Prerequisites	Winemaking and grape processing / Winemaking			
Aims	Introducing students with methods of determining the quality of wine (physico-chemical analysis and evaluation of organoleptic properties), as well as, conditions and treatments wine during its care and storage.			
Learning outcomes	The students have demonstrated the ability to: Analyze the parameters of the chemical composition of must; Analyze the parameters of the chemical composition of wine (classical - reference methods and fast methods in cellar); Sensory evaluation of wine; Organize technological process in the producing of red and white wine; Organize technological process during the treatment, care, storage and aging of wine;			
Lecturer / Teaching assistant	Prof. dr Radmila Pajović-Šćepanović			
Methodology	Lectures, laboratory work, practical work in the winery, visiting wineries, consultations, seminar work, colloquiums and final exam.			
Plan and program of work				
Preparing week	Preparation and registration of the semester			
I week lectures	Introducing students with: the subject, methods and work plan;			
I week exercises	Visit to the experimental winery of the Faculty of Biotechnology in order to learn about the technological process of wine production;			
II week lectures	Parameters of the chemical composition of: grapes, must and wine;			
II week exercises	Crushing and sulphuring of the grapes, and preparation for fermentation;			
III week lectures	Wine's quality factors; Physico-chemical analysis parameters of wine quality;			
III week exercises	Determining the chemical composition of the must: sugar, total acids, pH;			
IV week lectures	Instrumental methods of analysis parameters in wine (spectrophotometry and HPLC);			
IV week exercises	Determination of specific density during alcoholic fermentation;			
V week lectures	Quality evaluation of the wines:			
V week exercises	Racking wine, analyses curve of fermentation;			
VI week lectures	Colloquium I;			
VI week exercises	Visiting of wineries of Piperi sub-region;			
VII week lectures	Sensory evaluation of wines;			
VII week exercises	Determining the alcohol content in the prepared wine – fast method;			
VIII week lectures	Degustation technique; Concepts from sensory science;			
VIII week exercises	Methods of sensory evaluation of wine: OIV and Bux-Baum;			
IX week lectures	Legislation in the field of wine's quality control;			
IX week exercises	Racking wine from the first lees – litter, and decanting the wine into closed vessels;			
X week lectures	Technological procedures of basic operations in wine preparation and their impact on wine quality;			
X week exercises	Analysis of the specific density of wine and alcohol content, using a distillation apparatus and a hydrostatic scale;			
XI week lectures	Procedures for wine care and finishing during wine maturation and aging; Wine stabilization measures;			
XI week exercises	Spectrophotometric analysis of wine;			
XII week lectures	Aging of wine and bottling of wine;			
XII week exercises	Interpretation of chemical composition parameters and sensory assessment of wine;			

XIII week lectures	Wine cellars; Wine barrels; Equipment and installations in the winery;					
XIII week exercises	Visit the wine cellar, which stores wine in barrels					
XIV week lectures	Technique of micro-oxygenation of wine, Storing wine in barrels barrique;					
XIV week exercises	The second draining of the wine from the lees					
XV week lectures	Colloquium II;					
XV week exercises	Bottling of wine, Labeling of wine; Interpretation of wine chemical analysis data;					
Student workload						
Per week			Per semester			
5 credits x 40/30=6 hours and 40 minuts 3 sat(a) theoretical classes 2 sat(a) practical classes 0 excercises 1 hour(s) i 40 minuts of independent work, including consultations			Classes and final exam: 6 hour(s) i 40 minuts x 16 =106 hour(s) i 40 minuts Necessary preparation before the beginning of the semester (administration, registration, certification): 6 hour(s) i 40 minuts x 2 =13 hour(s) i 20 minuts Total workload for the subject: 5 x 30=150 hour(s) Additional work for exam preparation in the preparing exam period, including taking the remedial exam from 0 to 30 hours (remaining time from the first two items to the total load for the item) 30 hour(s) i 0 minuts Workload structure: 106 hour(s) i 40 minuts (courses), 13 hour(s) i 20 minuts (preparation), 30 hour(s) i 0 minuts (additional work)			
Student obligations			Students are required to attend classes, do excercises in the laboratory and wine cellar, take both colloquiums and the final exam.			
Consultations			Tuesdays from 13:00 to 14:00.			
Literature			1. M. Daničić (1988): Tehnologija vina – Praktikum, Poljoprivredni fakultet Beograd – Zemun; 2. B. W. Zoecklein, K. C. Fugelsang, B. H. Gump, F. S. Nury, (1995): Wine Analysis and Production, The Chapman-Hall Enology Library, New York.; 3. T. Košmarel, Milica Kač (2003): Osnovne kemijske analize mošta i vina; Laboratorijske vežbe za predmet Tehnologija vina, Biotehnički falultet, Univerzitet u Ljubljani; 4. P. Ribereau-Gayon et al (2000)., Handbook of enology, Vo1 2. The Chemistry and wine stabilization and treatments, Chapman&Hall; Dunod, Paris; 5. V. Radovanović (1986): Tehnologija vina, Građevinska knjiga, Beograd.; .			
Examination methods						
Special remarks						
Comment						
Grade:	F	E	D	C	B	A
Number of points	less than 50 points	greater than or equal to 50 points and less than 60 points	greater than or equal to 60 points and less than 70 points	greater than or equal to 70 points and less than 80 points	greater than or equal to 80 points and less than 90 points	greater than or equal to 90 points

Biotechnical Faculty / PLANT PROTECTION / TECHNOLOGY OF PLANT PROTECTION

Course:	TECHNOLOGY OF PLANT PROTECTION			
Course ID	Course status	Semester	ECTS credits	Lessons (Lessons+Exercises+Laboratory)
13381	Mandatory	3	5	2+0+2
Programs	PLANT PROTECTION			
Prerequisites	None			
Aims	Introducing students to Integrated Pest Management programs for different agricultural crops, the application of plant protection products, as well as non-pesticide measures. The aim of the course is to acquire knowledge about the importance of certain control measures in the appropriate phenophases of crop development. In addition to the use of plant protection products in the plant protection from harmful organisms, the possibilities of agrotechnical and other measures in the protection of cultivated plants from diseases, pests and weeds will be presented.			
Learning outcomes	After passing the exam, the student will acquire knowledge that allows him to: • Select the most appropriate measures of integrated plant protection and assess the importance of their implementation, • Organize protection of fruit trees and grapevine, • Organizes protection of vegetables and field crops, • Apply adequate protection measures in organic production.			
Lecturer / Teaching assistant	Prof. dr Nedeljko Latinović Mr Bogoljub Kandić			
Methodology	Lectures, Laboratory practice, Field work, Seminars			
Plan and program of work				
Preparing week	Preparation and registration of the semester			
I week lectures	Introduction, Integrated Pest Management			
I week exercises	Introduction to Integrated Pest Management programs for different agricultural crops			
II week lectures	Forecasting of diseases and pests			
II week exercises	Introduction to the possibilities of forecasting the occurrence of harmful organisms.			
III week lectures	Development of a program for the pome fruit protection			
III week exercises	Data processing and protection measures of fruit trees (practical application)			
IV week lectures	Development of a program for the stone fruit protection			
IV week exercises	Field exercises			
V week lectures	Development of a program for the nut trees protection			
V week exercises	Data processing and protection measures of fruit trees (practical application)			
VI week lectures	Development of a program for the small fruit protection			
VI week exercises	Data processing and protection measures (practical application)			
VII week lectures	Development of a grapevine protection program			
VII week exercises	Data processing and grapevine protection measures (practical application)			
VIII week lectures	Development of a program for the protection of subtropical fruit trees			
VIII week exercises	Data processing and fruit protection measures (practical application)			
IX week lectures	Development of potato protection program			
IX week exercises	Field exercises			
X week lectures	Development of a program for the protection of field crops			
X week exercises	Protection measures and organization of crop treatment			
XI week lectures	Development of outdoor vegetable protection programs			
XI week exercises	Protection measures and organization of vegetable treatment			
XII week lectures	Development of vegetable protection programs in open and protected areas			
XII week exercises	Protection measures and organization of vegetable treatment			
XIII week lectures	Development of a program for the protection of vegetables			
XIII week exercises	Field exercises			

XIV week lectures	Development of a program for the protection of small crops					
XIV week exercises	Protection measures (practical application)					
XV week lectures	Development of protection programs in organic agriculture					
XV week exercises	Field exercises					
Student workload						
Per week			Per semester			
5 credits x 40/30=6 hours and 40 minuts 2 sat(a) theoretical classes 2 sat(a) practical classes 0 excercises 2 hour(s) i 40 minuts of independent work, including consultations			Classes and final exam: 6 hour(s) i 40 minuts x 16 =106 hour(s) i 40 minuts Necessary preparation before the beginning of the semester (administration, registration, certification): 6 hour(s) i 40 minuts x 2 =13 hour(s) i 20 minuts Total workload for the subject: 5 x 30=150 hour(s) Additional work for exam preparation in the preparing exam period, including taking the remedial exam from 0 to 30 hours (remaining time from the first two items to the total load for the item) 30 hour(s) i 0 minuts Workload structure: 106 hour(s) i 40 minuts (courses), 13 hour(s) i 20 minuts (preparation), 30 hour(s) i 0 minuts (additional work)			
Student obligations			Students are required to attend classes, do seminar work, do all laboratory and field exercises and do both colloquiums.			
Consultations			After the lectures			
Literature			Strand, L.L. (1999): Integrated Pest Management for Stone Fruits. IPM handbook published by University of California; Ohlendorf, B.L.P. (1999): Integrated Pest Management for Apples and Pears (sec. ed.). IPM handbook published by University of California; Finckh, M. R., van Bruggen, A.H.C., Tamm, L. (2015): Plant Diseases and Their Management in Organic Agriculture; Wilcox, W.F. Gubler, W.D., Uyemoto, J. K. (2015): Compendium of Grape Diseases, Disorders, and Pests. American Phytopathological Society; Material from Internet; Lectures presentation.			
Examination methods			Activities in lectures and exercises: 5 points Seminar paper: 5 points Two colloquia: 40 points Final exam: 50 points			
Special remarks						
Comment						
Grade:	F	E	D	C	B	A
Number of points	less than 50 points	greater than or equal to 50 points and less than 60 points	greater than or equal to 60 points and less than 70 points	greater than or equal to 70 points and less than 80 points	greater than or equal to 80 points and less than 90 points	greater than or equal to 90 points