	Course: **ENOLOGY**			
Code	**Status of the course**	**Semester**	**ECTS**	Lecture classes
291107093	**Required**	**VI**	**4**	**2P+1L**
Academic Study Program: Basic academic studies - Fruit growing and Viticulture (studies last 2 semesters, 180 ECTS credits)				
Prerequisites: No				
Course aims: Acquring knowledge about: wine production, the chemical composition of must and wine, procedures of primary processing of grapes and must, fermentation process, wine stabilization, care and treatment of wine and determination of quality of wine.				
Teacher and assistants: Prof. Dr Radmila Pajović-Šćepanović				
The course consists of: Lectures, laboratory analyses, practical work in the winery of Biotechnical faculty, colloquiums, consultation, seminar paper and final exam.				
Course content:				
Week for preparation	Preparation and a enrollment of students;			
I week	Introducing students to the course and importance of wine culture;			
II week	The history of wine making; Introducing with the major wine-growing regions and wine countries in the world;			
Practical 1:	Visit to the winery of Biotechnical faculty for introducing with technological process of wine production;			
III week	Characteristics of grapes as base for wine production; Mechanical and chemical composition of grapes;			
Practical 2:	Analyses of mechanical composition of grapes;			
IV week	Grapes ripening and harvesting; Primary processing of grapes;			
Practical 3:	Analyses of chemical composition of must (density and content of sugar);			
V week	Vinification; Alcoholic fermentation; The strains of wine yeasts;			
Practical 4:	Analyses of acidity must and wine (total acidity and pH);			
VI week	*Colloquium I;*			
VII week	The application of SO_2 in wine production;			
Practical 5:	Analyzes of total and free SO_2 in wine;			
VIII week	Technology of producing white wine;			
Practical 6:	Analyses of wine density and content of alcohol - fast methods;			
IX week	Technology of production red and rose wine;			
Practical 7:	Analyses of wine density and content of alcohol by using distillation unit and hydrostatic balance;			
X week	Maturation, care and storage of the wine; Technological procedures and operations and equipment;			
Practical 8:	Visit to winery "13 Jul Plantaze" for introducing with technological procedures, operations of finalization wine and equipment;			
XI week	Spoilage and defects of wine; Preventing the emergence of these processes in wine;			
Practical 9:	Analyses of content of volatile acid in wine (fast method and with distillation unit);			
XII week	The technology of special vinification; Process of producing of liqueurs and sparkling wines;			
Practical 10:	Analyze of content of residual sugar in wine;			
XIII week	*Colloquium II;*			
XIV week	Quality evaluation of the wines: Sensory evaluation and analysis of the chemical composition of wine;			
Practical 11:	Techniques of sensory evaluation assessment of wines (OIV official *method*) and *Buxbaum method;*			
XV week	Protection designations and origin of names wines;			
Practical 12:	Interpretation parameters of the chemical composition of wine;			
XVI week	*Final exam;*			
End week	Verification of semester and enrollment of grade;			
XVIII-XXI week	Additional lessons and extra examination session.			
Student obligation:				

Weekly	***In semester***
4 credits x 40/30= 5 hours 20 min **Structure:** - 2 hours of teaching - 1 hours of practical work including colloquiums - 1 hour 20 min of individual work	Teaching and the final exam: (5 hours 20 min) x 16 = 85 hours 20 min Preparation before the beginning of the semester (administration, enrollment, etc) 2x(5 hours) = 10 hours 40 min Total work hours for the course: 4 x 30 = 120 hours Additional hours for preparing of examines in additional examination's period 0-24 hours Structure: 85 hours 20 min (lectures), 85 hours (preparation) and 24 hours (additional work)

Literatura:

1. Radovanović, V. (1986): Tehnologija vina, Građevinska knjiga, Beograd.
2. Daničić, M. (1988): Tehnologija vina – Praktikum, Poljoprivredni fakultet Beograd – Zemun.
3. Stanka Herjavec Skripta »Tehnologija vina«Agron*omski fakultet, Zagreb*
4. C. Flanzy(1998). Oenologie. Fondements scientifiques et technologiques Tech.& Doc./Lavoisier, Paris.
5. P. Ribereau-Gayon 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.

T**he forms of knowledge testing and grading:**

- Class attendance: 3 points
- Colloquiums 2x20 40 points
- Attendance at practices 3 points
- Seminar 5 points
- Final exam 49 points

Passing grade gets after cumulative collect at least 51 points.

Teacher, which gave information: Prof. Dr Radmila Pajović-Šćepanović

Special remarks for the course: The teaching is organized in their native language with the help of audio-visual devices

Note:

Learning outcomes:

The student have demonstrated the ability to:

- Being familiar with culture of wine (wine regions, types and categories of wine);
- Analyze the parameters of the mechanical composition of grape and chemical composition of must;
- Determine the best moment for harvesting;
- Analyze the process of fermentation;
- Organize technological process in the producing of red and white wine;
- Organize technological process during the treatment, care, storage and aging of wine;
- Analyze the sensory properties of wine;
- Recognize the primary defects and spoilage of wine;
- Analyze the chemical properties of wine in laboratory.

	Course: **ENOLOGY WITH GRAPE PROCESSING**			
Code	**Status of the course**	**Semester**	**ECTS**	Lecture classes
291107093	**Required**	**I**	**5**	**3L+2L**
Academic Study Program: Master academic studies - Fruit growing and Viticulture (studies last 4 semesters, 240 ECTS credits)				
Prerequisites: No				
Course aims: Acquring knowledge about: wine production, the chemical composition of must and wine, procedures of primary processing of grapes and must, fermentation process, wine stabilization, care and treatment of wine and determination of quality of wine.				
Teacher and assistants: Prof. Dr Radmila Pajović-Šćepanović				
The course consists of: Lectures, laboratory analyses, practical work in the winery of Biotechnical faculty, colloquiums, consultation, seminar paper and final exam.				

Course content:	
Week for preparation	Preparation and a enrollment of students;
I week	Introducing students to the course and importance of wine culture;
II week	The history of wine making; Introducing with the major wine-growing regions and wine countries in the world;
Practical 1:	Visit to the winery of Biotechnical faculty for introducing with technological process of wine production;
III week	Characteristics of grapes as base for wine production; Mechanical and chemical composition of grapes;
Practical 2:	Analyses of mechanical composition of grapes;
IV week	Grapes ripening and harvesting; Primary processing of grapes;
Practical 3:	Analyses of chemical composition of must (density and content of sugar);
V week	Vinification; Alcoholic fermentation; The strains of wine yeasts;
Practical 4:	Analyses of acidity must and wine (total acidity and pH);
VI week	*Colloquium I;*
VII week	The application of SO_2 in wine production;
Practical 5:	Analyzes of total and free SO_2 in wine;
VIII week	Technology of producing white wine;
Practical 6:	Analyses of wine density and content of alcohol - fast methods;
IX week	Technology of production red and rose wine;
Practical 7:	Analyses of wine density and content of alcohol by using distillation unit and hydrostatic balance;
X week	Maturation, care and storage of the wine; Technological procedures and operations and equipment;
Practical 8:	Visit to winery "13 Jul Plantaze" for introducing with technological procedures, operations of finalization wine and equipment;
XI week	Spoilage and defects of wine; Preventing the emergence of these processes in wine;
Practical 9:	Analyses of content of volatile acid in wine (fast method and with distillation unit);
XII week	The technology of special vinification; Process of producing of liqueurs and sparkling wines;
Practical 10:	Analyze of content of residual sugar in wine;
XIII week	*Colloquium II;*
XIV week	Quality evaluation of the wines: Sensory evaluation and analysis of the chemical composition of wine;
Practical 11:	Techniques of sensory evaluation assessment of wines (OIV official *method*) and *Buxbaum method;*
XV week	Protection designations and origin of names wines;
Practical 12:	Interpretation parameters of the chemical composition of wine;
XVI week	*Final exam;*
End week	Verification of semester and enrollment of grade;
XVIII-XXI week	Additional lessons and extra examination session.

Student obligation:	
Weekly	***In semester***
5 credits x 40/30= 6 hours and 40 min **Structure:** - 3 hours of teaching - 2 hours of practical work including colloquiums - 2 hours and 40 min of individual work	Teaching and the final exam: (6 hours and 40 min) x 16 = 160 hours and 40 min Preparation before the beginning of the semester: 2x(6 hours and 40 min) = 13 hours and 20 min Total work hours for the course: 5 x 30 = 150 hours Additional hours for preparing of examines in additional examination's period 0-30 hours Structure: 106 hours and 40 min. (lectures), 13 hours and 20 min. (preparation) and 32 hours (additional work)

Literatura:

1. Radovanović, V. (1986): Tehnologija vina, Građevinska knjiga, Beograd.
2. Daničić, M. (1988): Tehnologija vina – Praktikum, Poljoprivredni fakultet Beograd – Zemun.
3. Stanka Herjavec Skripta »Tehnologija vina«Agron*omski fakultet, Zagreb*
4. C. Flanzy(1998). Oenologie. Fondements scientifiques et technologiques Tech.& Doc./Lavoisier, Paris.
5. P. Ribereau-Gayon 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.

T**he forms of knowledge testing and grading:**

- Class attendance: 3 points
- Colloquiums 2x20 40 points
- Attendance at practices 3 points
- Seminar 5 points
- Final exam 49 points

Passing grade gets after cumulative collect at least 51 points.

Teacher, which gave information: Prof. Dr Radmila Pajović-Šćepanović

Special remarks for the course: The teaching is organized in their native language with the help of audio-visual devices

Note:

Learning outcomes:

The student have demonstrated the ability to:

- Being familiar with culture of wine (wine regions, types and categories of wine);
- Analyze the parameters of the mechanical composition of grape and chemical composition of must;
- Determine the best moment for harvesting;
- Analyze the process of fermentation;
- Organize technological process in the producing of red and white wine;
- Organize technological process during the treatment, care, storage and aging of wine;
- Analyze the sensory properties of wine;
- Recognize the primary defects and spoilage of wine;
- Analyze the chemical properties of wine in laboratory.

	Course: QUALITY WINE AND WINE STORAGE			
Code	**Status of the course**	**Semester**	**ECTS**	Lecture classes
	optional	2	5	3P+2L

Academic Study Program: Master academic studies - Fruit growing, Viticulture and Enology (studies last 4 semesters, 240 ECTS credits)

Prerequisites: No

Course aims: To introduce students with: wine production, methods of determining the quality of wine (physico-chemical analysis and sensory evaluation of wine), as well as, conditions and techniques of care and storage of wine

Teacher and assistants: Prof. Dr Radmila Pajović-Šćepanović

The course consists of: Lectures, practical work – preparation wines in the winery of Biotechnical faculty, laboratory analyses, seminar paper and final exam.

Course content:

Week for preparation	Preparation and a enrollment of students;
I week	Introducing students with course, method and plan;
II week	The parameters of the chemical composition of grape, must and wine;
Practical 1:	Crushing of the grapes, addition of SO_2 in crashed grape, and filling vessels for fermentation;
III week	Factors of wine's quality; Physico-chemical analysis parameters of wine quality;
Practical 2:	Analyses of chemical composition must: sugar, total acidity and pH;
IV week	Instrumental methods of analysis parameters in wine (spectrophotometry and HPLC);
Practical 3:	Monitoring of the fermentation (measuring the specific density of must);
V week	Quality evaluation of wine;
Practical 4:	Analysis of the fermentation process; Racking wine from the mark;
VI week	*Seminar paper I;*
VII week	Sensory evaluation characteristic of wine;
Practical 5:	Analyses of density of wine and content of alcohol - fast methods;
VIII week	The techniques of degustation of wine; the terms of the sensory evaluation of wine;
Practical 6:	Techniques of sensory evaluation assessment of wines (OIV official *method*) and *Buxbaum method;*
IX week	Legislation in the field of wine's quality control;
Practical 7:	Racking wine from the sediment, aeration and it's filling in the closed vessels;
X week	Technological procedures for basic operations in the preparation of wines and their impact to the quality of the wine;
Practical 8:	Analyses of density of wine and content of alcohol by using distillation unit and hydrostatic balance;
XI week	Treatment of wine during maturing and aging; Techniques of stabilization of wine;
Practical 9:	Spectrophotometric analysis of polyphenol compounds in wine;
XII week	Chemical changes in the wine during maturation and aging; Wine bottling;
Practical 10:	Interpretation parameters of the chemical and sensorial composition of wine;
XIII week	Wine cellars; Wine barrels ; Equipment and installations in the winery;
Practical 11	Visit wine cellar;
XIV week	Technique of microoxygenation wine, Storing wine in barrels bariqque;
Practical 12	Second racking wine from the sediment;
XV week	*Seminar paper II;*
XVI week	*Final exam;*
End week	Verification of semester and enrollment of grade;
XVIII-XXI week	Additional lessons and extra examination session.

Student obligation

Weekly	***In semester***
5 credits x 40/30= 6 hours and 40 min **Structure:** - 3 hours of teaching - 2 hours of practical work including colloquiums - 2 hours and 40 min of individual work	Teaching and the final exam: (6 hours and 40 min) x 16 = 160 hours and 40 min Preparation before the beginning of the semester: 2x(6 hours and 40 min) = 13 hours and 20 min Total work hours for the course: 5 x 30 = 150 hours Additional hours for preparing of examines in additional examination's period 0-30 hours Structure: 106 hours and 40 min. (lectures), 13 hours and 20 min. (preparation) and 32 hours (additional work)

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.; .

The forms of knowledge testing and grading:

- Class attendance: 3 points
- Colloquiums 2x20 40 points
- Attendance at practices 3 points
- Seminar 5 points
- Final exam 49 points

Passing grade gets after cumulative collect at least 51 points.

Teacher, which gave information: Prof. Dr Radmila Pajović-Šćepanović

Special remarks for the course: The teaching is organized in their native language with the help of audio-visual devices

Note:

Learning outcomes:

The students have demonstrated the ability to:

Being familiar with procedure of preparation red wines in the winery;
Analyze the parameters of the chemical composition of crushed grape/must;
Analyze the process of fermentation;
Analyze the parameters of the chemical composition of wine (classical - reference methods and fast methods in cellar);
Analyze the sensory properties of wine;
Organize technological process of producing white and red wines
Organize technological process during the treatment, care, storage and aging of wine.