

DESCRIPTION OF A STUDY COURSE – SYLLABUS

Title of a course	Grape and wine polyphenols				
Head of course	Kristijan Damijanić, Senior Lecturer				
Study programme	Specialist Professional Study of Winemaking				
Status of a course	Obligatory				
Year of study	2	Semester	III	ECTS credits	5
Teaching plan (L + E + S+ Pr)	2 + 1 + 0 + 0				
Goals of a course					
Introduction to various poly-phenolic compounds in grapes and wine, changes during grape ripening, extraction and influence of the vinification technique, chemical reactions during maturation and aging to realize the possibility of the technologist's influence on the organoleptic properties of wine.					
Conditions for enrolling course					
No conditions					
Learning outcomes on a level of a study programme which includes course					
<p>Outcome 2: Evaluate the impact of the terroir, technological maturity and harvesting technology to achieve the targeted quality of grapes and wine.</p> <p>Outcome 4: Evaluate the physiochemical composition of grape must and wine and evaluate their impact on the characteristics and quality of wine.</p> <p>Outcome 5: Select the appropriate techniques and methods, determining the technological processes in the vinification of white, rose and red wine.</p> <p>Outcome 7: Choose a specific production technology of autochthonous wine in order to preserve the variety specificities.</p> <p>Outcome 11: Substantiate the development stage of wine and evaluate its commercial value.</p>					
Expected learning outcomes on a level of a course					
<ol style="list-style-type: none"> 1. Describe grape and wine polyphenols. 2. Define basic groups of polyphenols, describe their properties, and link the structure of polyphenols and their antioxidant effect. 3. Define the technological processes that affect changes in particular groups of polyphenols during wine vinification and processing. 4. Describe the procedures for polyphenols analysis by sensory analytical methods 					
Content of a course					
Polyphenolic composition of grapes and wine. Division of polyphenolic compounds. Biosynthesis of flavonoids and non-flavonoids. The influence of environmental factors on the quantitative and qualitative composition. Location and distribution of different polyphenols in grapes. Changes in anthocyanins and tannins during grape ripening. Influence of the vinification technique on the extraction of anthocyanins and tannins from grapes. The influence of temperature and weather. Oxidative degradation of anthocyanins. Chemical equilibrium of anthocyanins dependent on sulphur dioxide and pH. Reactions of tannins, proteins and polysaccharides. Condensation reactions of tannins and anthocyanins. Co pigmentation of anthocyanins. Organoleptic properties of polyphenolic compounds in red wine. Chemical reactions during maturation and aging of wine: reactions of anthocyanins and their influence on colour, reactions of tannins and their influence on taste. Origin of colour in white wine. Enzymatic and non-enzymatic browning of white wine.					
Teaching modes	<input checked="" type="checkbox"/> lectures <input type="checkbox"/> auditory exercises <input checked="" type="checkbox"/> seminars and workshops <input type="checkbox"/> distance learning <input type="checkbox"/> field classes		<input checked="" type="checkbox"/> individual assignments <input type="checkbox"/> multimedia and network <input type="checkbox"/> laboratory <input type="checkbox"/> supervisor's work <input type="checkbox"/> other _____		
Comments					

Students' obligations

Grading, evaluation and monitoring of students' work continuously during lectures and exams

Grading is based upon evaluation of course's learning outcomes' adoption. Grading is performed continuously during lectures and/or during exam, in compliance with the provisions of Regulation on the assessment of students.

Continuous check-up:

Outcomes	Pre-exam I	Laboratory exercises	Sensory analysis	Threshold	Max
Outcome 1	20	/	/	10 %	20 %
Outcome 2	20	/	/	10 %	20 %
Outcome 3	10	10	/	10 %	20 %
Outcome 4	5	5	10	10 %	20 %
Outcome 5	/	10	10	10 %	20 %
Percentage of ECTS	3	1	1	-	-
Total	55 %	25 %	20 %	50 %	100 %

A student has passed the exam if he has acquired a percentage of credits for each learning outcome higher or equal to defined threshold.

Exam term:

Note * - before taking the exam the student must master the laboratory exercises

Outcomes	Written exam	Oral exam	Threshold	Max
Outcome 1	15	5	10 %	20 %
Outcome 2	15	5	10 %	20 %
Outcome 3	10	10	10 %	20 %
Outcome 4	10	10	10 %	20 %
Outcome 5	5	15	10 %	20 %
Percentage of ECTS	3	2	-	
Total	55 %	45 %	50 %	100 %

A student has passed the exam if he has acquired a percentage of credits for each learning outcome higher or equal to defined threshold.

Grading:

A student has passed the exam if he has acquired at least 50% of anticipated credits of a specific learning outcome.

If a student has passed learning outcomes of all courses, the accomplished credits (percentages) of all passed learning outcomes are being added, while the final grade is defined upon following table:

Range of credits (percentages)	Numerical grade	ECTS grade
90,00 – 100,00	Excellent (5)	A
75,00 – 89,99	Very good(4)	B
60,00 – 74,99	Good(3)	C
50,00 – 59,99	Sufficient (2)	D
0,00 – 49,99	Insufficient (1)	F

Obligatory literature

1. Jackson R.S. (2000). Wine science. Academic Press, New York, SAD
2. Radovanović, V. (1986). Tehnologija vina, IRO „Građevinska knjiga“, Beograd
3. Vermerris, W, Nicholson, R. (2006). Phenolic Compound Biochemistry, Springer, The Netherlands

Additional literature
<ol style="list-style-type: none">1. Coombe B.G., Dry, P.R. (2008). Viticulture – Volume 2 Practices. Winetitles, Ashford, Australia.2. Fregoni M. (2005). Viticoltura di qualità. Tecniche nuove, Italija3. Galet P. (2000). General Viticulture. Oenoplurimédia, Chaintré, Francuska4. Keller, M. (2010). The science of grapevines. Anatomy and physiology. Academic Press, New York, SAD5. Zoričić, M. (1996). Podrumarstvo II – prošireno izdanje, Globus, Zagreb.

