

### DESCRIPTION OF A STUDY COURSE – SYLLABUS

<b>Title of a course</b>	Wine microbiology				
<b>Head of course</b>	Kristijan Damijanić, Senior Lecturer				
<b>Study programme</b>	Specialist Professional Study of Winemaking				
<b>Status of a course</b>	Obligatory				
<b>Year of study</b>	1	<b>Semester</b>	I	<b>ECTS credits</b>	7
<b>Teaching plan (L + E + S+ Pr)</b>	2 + 1 + 0 + 1				
<b>Goals of a course</b>					
Introducing students to new knowledge and importance of microorganisms in winemaking. Fundamentals of wine microbiology application in wine production.					
<b>Conditions for enrolling course</b>					
No conditions					
<b>Learning outcomes on a level of a study programme which includes course</b>					
<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 6: Identify yeasts and bacteria for alcoholic, malo-lactic and malo-ethanol fermentation.</p> <p>Outcome 7: Choose a specific production technology of autochthonous wine in order to preserve the variety specificities.</p> <p>Outcome 8: Substantiate the influence of significant factors on the processes and concentration of the most significant wine components</p> <p>Outcome 11: Substantiate the development stage of wine and evaluate its commercial value.</p>					
<b>Expected learning outcomes on a level of a course</b>					
<ol style="list-style-type: none"> <li>Describe the role of microorganisms in wine production.</li> <li>Describe microorganisms causing wine spoilage with particular emphasis on Brettanomyces.</li> <li>Define new directions in the selection of yeasts and bacteria.</li> <li>Suggest selected yeasts for each variety and type of wine.</li> <li>Select bacteria and yeasts for biological deacidification and wine refermentation</li> </ol>					
<b>Content of a course</b>					
<p>The role and importance of microorganism in wine production; the history of research related to wine microbiology; description of the most important microorganism species that play a role in wine production. The importance and role of yeast during alcoholic fermentation - new findings; problematic fermentations and their initiation. Importance and role of lactic acid bacteria and yeast during malolactic and low ethanol fermentation. Description and role of microorganisms (yeasts, bacteria and actinomycetes) in causing wine spoilage. History of yeast selection in the world and in Croatia; technological and qualitative characteristics of yeasts in selection; lactic acid bacteria selection. Yeast and lactic acid bacteria application procedures in wineries. Production of vinegar on family farms and in the industry; GM in wine production.</p>					
<b>Teaching modes</b>	<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 _____		
<b>Comments</b>					
<b>Students' obligations</b>					
<b>Grading, evaluation and monitoring of students' work continuously during lectures and exams</b>					

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	Practical work	Threshold	Max
Outcome 1	20	/	/	/	10%	20%
Outcome 2	15	/	5	/	10%	20%
Outcome 3	10	5	/	5	10%	20%
Outcome 4	10	5	5	%	10%	20%
Outcome 5	/	5	5	10	10%	20%
Percentage of ECTS	4	1	1	1		
Total	55%	15%	15%	15	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:**

Outcomes	Written exam	Oral exam	Threshold	Max
Outcome 1	15%	5%	10%	20%
Outcome 2	15%	5%	10%	20%
Outcome 3	15%	5%	10%	20%
Outcome 4	10%	10%	10%	20%
Outcome 5	10%	10%	10%	20%
Percentage of ECTS	5	2		
Total	65%	35%	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. Duraković, S., Redžepović, S. (2002) Uvod u opću mikrobiologiju, Udžbenik Sveučilišta u Zagrebu, Zagreb
2. Duraković, S. (1996) Primijenjena mikrobiologija, Udžbenik Sveučilišta u Zagrebu, Zagreb
3. Fleet, G.H. (1993) Wine Microbiology and Biotechnology, T&F STM
4. Fungelsang, K. (1997) Wine Microbiology, Kluwer Academic Publishers
5. Riberau-Gayon, P., D., Dubourdieu, B., Doneche, A., Lonvaud (2006): Handbook of enology-The microbiology of Wine and Vinification, Volume 1, John Wiley & Sons, Paris

**Additional literature**

1. Duraković, S., Duraković, L. (2000) Specijalna mikrobiologija, Udžbenik Sveučilišta u Zagrebu, Zagreb.
2. Winde, J.H. (2003) Functional Genetics of Industrial Yeasts, Springer

3. Zimmermann, F.K., Entian K.-D. (1997) Yeast sugar metabolism, Technomic Publishing

