



# UNIVERSITÀ DEGLI STUDI DI PALERMO

<b>DEPARTMENT</b>	Scienze Agrarie, Alimentari e Forestali		
<b>ACADEMIC YEAR</b>	2021/2022		
<b>BACHELOR'S DEGREE (BSC)</b>	VITICULTURE AND OENOLOGY		
<b>SUBJECT</b>	OENOLOGICAL MICROBIOLOGY		
<b>TYPE OF EDUCATIONAL ACTIVITY</b>	B		
<b>AMBIT</b>	50125-Discipline della produzione vegetale		
<b>CODE</b>	16098		
<b>SCIENTIFIC SECTOR(S)</b>	AGR/16		
<b>HEAD PROFESSOR(S)</b>	MOSCHETTI GIANCARLO	Professore Ordinario	Univ. di PALERMO
<b>OTHER PROFESSOR(S)</b>			
<b>CREDITS</b>	9		
<b>INDIVIDUAL STUDY (Hrs)</b>	135		
<b>COURSE ACTIVITY (Hrs)</b>	90		
<b>PROPAEDEUTICAL SUBJECTS</b>			
<b>MUTUALIZATION</b>			
<b>YEAR</b>	2		
<b>TERM (SEMESTER)</b>	2° semester		
<b>ATTENDANCE</b>	Not mandatory		
<b>EVALUATION</b>	Out of 30		
<b>TEACHER OFFICE HOURS</b>	<b>MOSCHETTI GIANCARLO</b> Monday 11:00 13:00 Palermo, Via delle Scienze, Edificio 5 primo piano Studio Prof. Giancarlo Moschetti Tuesday 11:00 12:00 Palermo, Via delle Scienze, Edificio 5 primo piano Studio Prof. Giancarlo Moschetti		

DOCENTE: Prof. GIANCARLO MOSCHETTI

<b>PREREQUISITES</b>	In order to successfully attend this course it is desirable that the student has acquired the skills and knowledge that come from basic courses: mathematics, physics, general chemistry, inorganic, organic and biochemistry, biology. Also desirable are the knowledge of at least decent English and the ability to use the Internet for research and information management.
<b>LEARNING OUTCOMES</b>	<p>Knowledge and understanding: The student acquires the knowledge base to face the issues of the viticultural and oenological sectors from a microbiological point of view and the specific language of microbiology. Therefore, he has the ability to understand the content of textbooks related to the course also advanced and to transfer this knowledge into work and professional sector.</p> <p>Applying knowledge and understanding: Ability to recognize and organize autonomously studies, guided fermentation and processing necessary for an improvement of the biological process.</p> <p>Making judgments: Being able to evaluate the implications and results of microbiological studies.</p> <p>Communication skills: Ability to present the results of microbiological studies a non-expert public too. Be able to support the importance and highlight the qualitative effects of wine microbiology studies.</p> <p>Learning skills: Ability to update by consulting the scientific publications of the own wine microbiology. Ability to follow, using the knowledge acquired in the course, both first-level master, both in depth courses both specialized seminars in the field of wine microbiology.</p>
<b>ASSESSMENT METHODS</b>	<p>Two structured tests (multiple choice): the first test in the middle course and the second at the end of the course.</p> <p>The two tests aimed to assess the possession of skills, capacity and competence provided by the course. The well-defined questions, distinct and uniquely interpretable, strongly suggests the answer independently and are structured so as to ensure comparability. Skills' and knowledge of students are not tested through an independent processing of answers to questions, but rather through the choice of correct answer among the four present in the question. The score assigned to each question is determined by the teacher before the tests. The scores is in thirty.</p> <p>The final assessment, properly graded, will be formulated on the basis of the following conditions:</p> <p>a) Basic knowledge of general and wine microbiology and limited ability to independently apply the concepts in new situations, sufficient capacity for analysis of the presented phenomena and the procedures followed exposure (18-21 rating);</p> <p>b) good knowledge of general and wine microbiology studied and ability to apply it independently in situations similar to those studied, discrete analysis capabilities of the presented phenomena and the procedures followed exposure (22-25 rating);</p> <p>c) thorough knowledge of general and wine microbiology studied and ability to apply it to any proposed biological phenomenon, but not always readily and following a linear approach, good analytical skills of the presented phenomena and the procedures followed exposure (26-28 rating);</p> <p>d) depth knowledge of general and wine microbiology studied and ability to apply it promptly and properly to any proposed microbiological phenomenon, excellent analytical skills of the presented phenomena and excellent communication skills (29-30L vote).</p>
<b>EDUCATIONAL OBJECTIVES</b>	The course provides the knowledge about microorganisms as components of agricultural and technological ecosystems, in particular wine; It shows the interactions of microorganisms with the wine environment and other biota; It provides evidence related to techniques and microbiological analysis; It provides microbiological knowledge of the wine industry. It provides fundamental knowledge on yeast and bacteria and spoilage microorganisms. The course provides the basis for the management and control of spontaneous fermentations and controlled fermentation by using yeast starter as well as the malolactic fermentation for the production of quality wines.
<b>TEACHING METHODS</b>	Frontal lessons, Exercises in the classroom and in the laboratory Visit education seminars
<b>SUGGESTED BIBLIOGRAPHY</b>	<p>-Appunti delle lezioni di Microbiologia Enologica.</p> <p>- Moschetti G &amp; Francesca N (2013). I lieviti del Vino Fiano di Avellino DOCG: la tipicità attraverso le biotecnologie. Imago editrice 99pp, ISBN: 978-88-95230-20-7</p> <p>-Vincenzini M, Romano P. Farris GA (2005): Microbiologia del vino. Casa Ed. Ambrosiana, Milano..</p> <p>-Ribereau-Gayon P., D. Dubourdieu, B. Doneche, A. Lonvaud. Trattato di Enologia: Volume 1, , Edagricole, Bologna 2003.</p> <p>-Biovati B e Sorlini C (2007) Microbiologia generale ed agraria. Ambrosiana ed., Milano</p>

**SYLLABUS**

<b>Hrs</b>	<b>Frontal teaching</b>
1	Aims of the discipline and its subdivision. Organization of the course, mode of evaluation
2	The characteristics that make microorganisms the legitimate belonging to diverse and large community of the living; the characteristics that make the microorganisms a homogeneous entity although constituted by a great variety of strains.
3	Presentation of the main microbial groups. The role of microorganisms in agriculture and in the environment. The division in prokaryotes and eukaryotes.
5	The characteristics that allow you to describe, identify, recognize and classify a microorganism.
4	STRUCTURAL CHARACTERISTICS The micro and macro morphology, structure of the bacterial cell (prokaryote) structure, chemical composition and functions of the capsule, cell wall, cell membrane, ribosomes, the genome of the plasmids, the inclusions, the appendices and the endospores.
2	Energy metabolism and relationships with oxygen. The diverse nature of the processes and the different types and their discriminant value. Nutritional and cultural needs and habitats for microorganisms.
2	The microbial growth. The curve of the bacterial growth; factors influencing microbial growth
8	Notes about Viticultural Microbiology: geobiochemical cycles, nitrogen cycle, rhizosphere, The plant growth promoting rhizobacteria ; The mycorrhizies
1	History of Oenological Microbiology
5	Outline of structural studies, genetic elements of yeast . The nutrition, growth and metabolism of yeasts
4	lifecycle, genetics and genetic improvement of yeasts
5	taxonomy and ecology of the main wine yeast
4	The Alcoholic fermentation and its metabolic deviations
6	Spontaneous fermentation and fermentation with yeast starter
6	Isolation, selection and use od yeast starter
4	The Lactic acid Bacteria, malolactic fermentation; Notes about alterations due to lactic acid bacteria
1	notes about Acetic bacteria
<b>Hrs</b>	<b>Workshops</b>
22	Observation to microscopy of bacteria and yeast; Microbial counts od bacteria and yeast; Isolation of yeast; Identification of yeast and bacteria; protocol to obtained a "pied de cuve" of fermentation
<b>Hrs</b>	<b>Others</b>
5	Visiting to a wine farm