

General Information	
Academic subject	Enology and Enological Chemistry (I.C. Enology and Packaging)
Degree course	Food Science and Technology
ECTS credits	6 CFU (5 ECTS of Lectures + 1 ECTS of laboratory or guided visits to wineries)
Compulsory attendance	No
Teaching language	Italian

Subject teacher	Name Surname	Mail address	SSD
	Giuseppe Gambacorta	giuseppe.gambacorta@uniba.it	AGR/15

ECTS credits details	
Basic teaching activities	5 ECTS Lectures 1 ECTS Laboratory or field classes

Class schedule	
Period	I Semester
Course year	Third
Type of class	Lecture- workshops

Time management	
Hours	150
In-class study hours	54
Out-of-class study hours	96

Academic calendar	
Class begins	September 27 th , 2021
Class ends	January 21 th , 2022

Syllabus	
Prerequisites/requirements	Prerequisites: "Chemistry" and "Unit operations of food technology" Requirements: knowledge of general, inorganic and organic chemistry; knowledge of the activity and needs of microorganisms; knowledge of the main unit operations of food technology.
Expected learning outcomes	<p><i>Knowledge and understanding</i></p> <ul style="list-style-type: none"> ○ Knowledge and understanding of biochemical phenomena occurring during ripening of grapes and during winemaking, and ripening, stabilization and preservation of wines. <p><i>Applying knowledge and understanding</i></p> <ul style="list-style-type: none"> ○ Ability to identify and apply with autonomy the appropriate winemaking technologies depending on the compositional characteristics of the grape. ○ Ability to identify and carry out technological interventions during the wine aging process in order to obtain a healthy and stable product over time. <p><i>Making informed judgements and choices</i></p> <ul style="list-style-type: none"> ○ Ability to interpret the results of analytical controls of wines and to establish the most appropriate technological interventions for qualitative improvement. <p><i>Communicating knowledge and understanding</i></p> <ul style="list-style-type: none"> ○ Ability to communicate the importance of raw material quality and of the rational application of winemaking technologies in order to obtain product of quality. ○ Ability to describe the impact of technological variables on the quality characteristics of wines, even to an inexpert public. <p><i>Capacities to continue learning</i></p>

	<ul style="list-style-type: none"> ○ Ability to update and deepen the knowledge of winemaking techniques through the study of scientific publications in the field of enological sector.
Contents	<ul style="list-style-type: none"> • Grape composition: distribution of the various classes of substances in the various parts of the grape. • Sugars: types, origin, and evolution. • Organic acids: types, origin, and evolution. • Salts: saline equilibrium, precipitations. • Phenolic compounds: types and classes of substances (phenolic acids and derivatives, flavonoids, anthocyanins, tannins), properties, and evolution during winemaking and ageing. Organoleptic effects of phenolic compounds. • Aromatic substances: classes and types of aromatic substances, origin and aroma evolution. • Correction of musts. • Endogenous and exogenous enzymes, role, use in enology. • The role and use of sulfur dioxide in enology. • Alcoholic fermentation, yeast needs to grow, secondary products of yeasts fermentation, production of higher alcohols, malo-alcoholic fermentation. • Lactic bacteria: malo-lactic fermentation, effects on the biological stability and on organoleptic characteristics. • Red winemaking: maceration management using technological variables. • White winemaking: pre-fermentative treatments, iperoxidation, reductive winemaking, musts clarification techniques, fermentation management. • Rosé winemaking. • Carbonic maceration. • Grape drying techniques and straw wine production. • Tartaric and proteic wines stabilization. • Enological additives use. • Fining and ageing of wines. • Wine defects, strategies for prevention and care. • Sparkling winemaking (Champenoise and Charmat methods). • Fortified wines: Marsala, Porto, Jerez. • Didactic tour in vinery. • Chemical, physical analysis of wines. • Cases study.
Course program	
Reference books	<ul style="list-style-type: none"> • Note of the lecture distributed during the course. • Teaching material available and downloaded from social e-learning platform Edmodo during the course. • Ribéreau-Gayon P., Dubourdieu D., Donèche B., Lonvaud, A. (2006). The Microbiology of Wine and Vinifications. <i>Handbook of Enology</i>. In: <i>Handbook of enology</i>. Vol. 1. 2nd edn. John Wiley & Sons, Chichester, England. • Ribéreau-Gayon P., Dubourdieu D., Donèche B., Lonvaud, A. (2006). The Chemistry of Wine - Stabilization and Treatments. <i>Handbook of Enology</i>. In: <i>Handbook of enology</i>. Vol. 2. 2nd edn. John Wiley & Sons, Chichester, England. • Lanati D. (2007). De Vino "Lezioni di enotecnologia". Edizioni AEB. • De Rosa T. (1987). Tecnologia dei vini liquorosi e da dessert, Edizione AEB, Brescia. M. Marconi, D. Fajner, G. Benevelli, G. Vicoli – Dentro al gusto: arte, scienza e piacere nella degustazione. Edagricole, Bologna, 2007.

Notes	
Teaching methods	<p>The course topics will be treated with the help of Power Point presentations, case studies discussion, exercises in the classroom and laboratory, educational visits to sensory and instrumental analysis laboratories.</p> <p>Lecture notes and educational supplies will be provided by means of a mailing list or online platforms (i.e.: Edmodo, Google Drive...)</p>
Evaluation methods	<p>The exam consists of an oral dissertation on the topics developed during the theoretical and theoretical-practical lectures in the classroom and in the laboratory/production plants, as reported in the Academic Regulations for the Bachelor Degree in Food Science and Technology (article 9) and in the study plan (Annex A).</p> <p>Students attending at the lectures may have a middle-term preliminary exam, consisting of a written test, relative to the first part of the program, which will concur to the final evaluation and will be considered valid for a year.</p> <p>The evaluation of the preparation of the student occurs on the basis of established criteria, as detailed in Annex B of the Academic Regulations for the Bachelor Degree in Food Science and Technology.</p> <p>Non-Italian students may be examined in English language, according to the aforesaid procedures.</p>
Evaluation criteria	<p><i>Knowledge and understanding</i></p> <ul style="list-style-type: none"> ○ Describe the components of grape and their evolution during ripening on the vine and during vinification. <p><i>Applying knowledge and understanding</i></p> <ul style="list-style-type: none"> ○ Describe the wine production processes according to the raw material and product required by the consumer. ○ Describe the impact of technological variables and stabilisation treatments on the quality and health characteristics of wines. <p><i>Making informed judgements and choices</i></p> <ul style="list-style-type: none"> ○ Interpret the results of wine analysis and propose technological solutions for quality improvement. <p><i>Communicating knowledge and understanding</i></p> <ul style="list-style-type: none"> ○ Illustrate the layout of the wine production process by reporting any critical points and quality control strategies. ○ Illustrate hypothetical winemaking technologies according to the compositional characteristics of the raw material. <p><i>Capacities to continue learning</i></p> <ul style="list-style-type: none"> ○ Ability to deepen and update independently the oenological knowledge acquired.
Receiving times	Tuesday-Friday by previous agreement