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	October 1st, 2018
Class ends	January 18th, 2019

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	*Knowledge and understanding* ○ Knowledge and understanding of biochemical phenomena occurring during ripening of grapes and during winemaking, and ripening, stabilization and preservation of wines. *Applying knowledge and understanding* ○ 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. *Making informed judgements and choices* ○ Ability to interpret the results of analytical controls of wines and to establish the most appropriate technological interventions for qualitative improvement. *Communicating knowledge and understanding* ○ 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. *Capacities to continue learning*

	○ Ability to update and deepen the knowledge of winemaking techniques through the study of scientific publications in the field of enological sector.
Contents	• 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	• Note of the lecture distributed during the course. • Teaching material available and downloaded from social e-learning platform Edmodo during the course. • Pagliarini E. – Valutazione sensoriale: aspetti teorici, pratici e metodologici. Hoepli editore, Milano, 2002. • Cabras P., Tuberoso C.I.G. “Analisi dei prodotti alimentari” Piccin Nuova Libreria S.p.A. editore, Padova, 2014. • Stone H., Sidel J.L.. Sensory Evaluation Practices, 2nd ed. Academic Press, S. Diego, CA, 1993. *Additional readings* • S.Porretta – Analisi sensoriale & consumer science. Chiriotti editori, Pinerolo, 2000. • Ramon Viader Guixa – Vino Corpo e Cervello: riflessione critica sull’utilizzo dei nostrisensi nella conoscenza del vino. AEB group, 2005.

	• M. Marconi, D. Fajner, G. Benevelli, G. Vicoli – Dentro al gusto: arte, scienza e piacere nella degustazione. Edagricole, Bologna, 2007.
Notes	
Teaching methods	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. Lecture notes and educational supplies will be provided by means of a mailing list or online platforms (i.e.: Edmodo, Google Drive…)
Evaluation methods	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). 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. 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. Non-Italian students may be examined in English language, according to the aforesaid procedures.
Evaluation criteria	*Knowledge and understanding* ○ Describe the physiology of the senses, the procedure for the creation of a sensory panel and the discriminating and descriptive sensory analysis methods. ○ Describe the methods of instrumental analysis for the assessment of the quality and genuineness of foods. *Applying knowledge and understanding* ○ Describe the most appropriate sensory analysis tests to apply to foods in accordance with the predetermined goals. ○ Describe the instrumental analytical techniques to be used for the analysis of quality, genuineness and compliance of specific food products. *Making informed judgements and choices* ○ Interpret the results of sensory and instrumental analysis to establish the quality, genuineness and compliance requirements of foods. *Communicating knowledge and understanding* ○ Illustrate the qualitative characteristics of foods through their sensory descriptors. ○ Illustrate compliance with the requirement for quality, genuineness and the respect to normative, based to analytical parameter results. *Capacities to continue learning* ○ Study and propose new chemical, physical and sensory methods for the assessment of quality, genuineness and compliance with the specific food norms.
Receiving times	Tuesday-Friday by previous agreement at the “Dipartimento di Scienze del Suolo, della Pianta e degli Alimenti (DiSSPA)”.