# .- Advances in Enology

## Prof. Milena Lambri- Mario Gabrielli

***COURSE AIMS AND EXPECTED LEARNING SKILLS***

Students will deepen knowledge related to enology in order to master solutions suitable to solve practical issues in the winery. The course will include new perspectives bound to climate change and to a more efficient use of adjuvant and additives. Expected learning skills are better defined below.

**Knowledge and analysis ability**.

At the end of the course the student is expected to own fundamental knowledge about enology, effects and constraints related to winemaking management and wine composition and applied techniques related to key practices such as stabilization and bottling.

**Know-how and its application**

The student will be able to apply the learned principles and techniques to recognize limiting factors affecting each winemaking type in order to provide suitable solutions. More specifically, the student is expected to successfully manage situation leading to unhopeful wine unbalances and contaminations with spoilage microbes or molecules. For each of such critical item, the student is expected to be able to provide the most suitable corrective actions to restore wine quality.

**Autonomy in self-assessment**

In front of a given winemaking issue, the student is expected to provide autonomous analysis and thinking inspired to the acquired knowledge rather than based on popular “rule of thumbs” applications.

**Communications skills**

The student is expected to be able to successfully deliver, in both oral and written forms, a correct diagnose and discussion of the different winemaking practice using proper technical language.

**Learning capacities**

Regardless of previous background, at the end of the course the student will have to hold learning capacities suitable to either lead him/her to higher study courses or to successfully tackle a job appointment. The aim is to introduce students to the most advanced innovation in oenology and providing them the most recent elements for chemical and sensory tests.

A depend knowledge and comprehension about the hottest issues in modern winemaking are the main expected outcomes gained by the students at the end of the course.

***COURSE CONTENT AND STRUCTURE***

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|  | **ECTS credits** |
| **Wine stabilization** |  |
| Colloids and salts; grape and wine proteins; factors affecting colloidal stability (pH, ethanol, sulfate ion, polyphenols); tartrate holding capacity. Tests to evaluate colloidal and tartrate stability of wines. | 1.0 |
| Adjuvants and additives in enology: main roles; regulation; allergenic issues; sustainable products; optimization of their use to reduce production costs and to increase wine resilience. | 1.0 |
| **Managing wine making factors** |  |
| Temperature, time, enzymes, oxygen, and mixing techniques to improve phenolic extraction in red vinification; impact of different conditions on aroma compounds. | 1.0 |
| **Plants and design optimization in winemaking** |  |
| Design of a wine cellar; newest installations for grape crushing, pressing, fermentation, filtration, and heat management. | 1.0 |
| **Wine bottling** |  |
| Bottling line, standard requirements for each bottle type, regulation. Traditional cork closures: processes to obtain different kind of stoppers; technical papers; cork taint and techniques to limit the risk of wine contamination; tightness problems. | 1.0 |
| Bottle seals alternatives to cork stoppers: synthetic closures, screw caps. Production processes; regulation; behavior toward white wine browning and red wine evolution; shelf-life studies. | 1.0 |
| **Practical experience** |  |
| Chemical lab: more recent analytical techniques of grape, must and wine. | 1.0 |
| Sensory lab: sensory analysis of wines obtained at varying process conditions. | 1.0 |

***READING LIST***

R. B. Boulton, V.L. Singleton, L.F. Bisson, R.E. Kunkee*, Principles and Practices of Winemaking*, *Springer Verlag, 1988.*

P. Ribereau-Gayon, D. Dubourdieu, B. Doneche, A. Lonvaud*, Handbook of Enology, 2nd Edition, Vol.1 & 2*, *Wiley,2005*.

P. Iland, N. Bruer, G. Edwards, S. Caloghiris, E. Wilkes, *Chemical Analysis of Grapes and Wine: Techniques and Concepts, 2nd Edition, Patrick Iland Wine Promotions Pty Ltd*, *2013.*

R.S. Jackson, *Wine Tasting a professional handbook, 2nd Edition, Academic Press, Elsevier,2009.*

***TEACHING METHOD***

The teaching method will include the following activities:

1) Indoor class where main course topics will be covered along with several applied examples. Teaching methos will use high interactivity between teacher and students to stimulate discussion.

2) Indoor exercises and outdoor practical activities aimed at comprehension of equipment functioning and on how to perform some operations in winemaking.

3) Field visits within the national territory for a better appreciation of the wine value chain. Topics covered during the visit are intergap part of the cluster program.

***Assessment method and CRITERIA***

The examination will take place in different ways for attending and not attending students.

* For attending students there will be, at the end of the course, a written test to verify the level of learning reached after participation in all lessons. The test will last three hours and will be based on thirty choice questions. The overcoming of the final test, within one year, will exempt the student from preparing the corresponding part of the program for the final examination. This will be oral and will result in the assignment of a score that, out of thirty, will be averaged with the marks obtained in the written test. The student who does not intend to make use of the marks obtained in the written test and the corresponding partial exemption may, however, take the oral examination in the manner and contents that are reported below for non-attending students.
* Non-attending students will take the oral examination on the entire program as like as reported into the guidance of the degree course according to the bibliography therein.
* Through the written test the students will have to demonstrate knowledge of information, distinctions and key concepts of the discipline treated; through the oral interview we will insist more on the readings in the program.
* In both, written and oral exam, the relevance of the answers, the appropriate use of specific terminology, the argumentative and coherent structuring of the discourse, the ability to identify conceptual links will contribute to the evaluation.

***Notes and pre-requisites***

General knowledge on the winemaking process and skills about grape composition are useful to the student for the purpose of a profitable frequency of the course and for passing the relative exam.

After lessons in her office by the Department for sustainable food processes DiSTAS and/or by e-mail appointment.