# Applied Viticulture

## Prof. stefano poni

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

Students will acquire fundamental knowledge about general viticulture (current diffusion, vine anatomy and physiology). Basics on vineyard design and management will be provided by considering an array of genotypes and environmental conditions. Expected learning outcomes are better defined below.

**Knowledge and analysis ability**

At the end of the course students are expected to own fundamental knowledge about grapevine anatomy and physiology, source-to-sink relationships and short to long term solutions allowing achievement of vine balance towards high quality standards.

**Know-how and its application**

Students must be able to apply the learned physiological principles to design a new vineyard by performing the most appropriate decisions in terms of site selection, plant material and density. In addition, students will be able to identify the most appropriate cultural practices considering that their timing and severity can vary according to environmental conditions and enological targets.

**Autonomy in self-assessment**

Students will also be able to assess technical issues and economic convenience of several cultural practices including adoption of mechanical operations in traditional vineyard management and grape harvesting.

**Communication skills**

Students are expected to be able to demonstrate, in both oral and written forms, good handling of technical language and to also to participate with a good degree of interaction to stakeholders’ panels or focus groups discussing various viticulture items.

**Learning capacities**

At the end of the course students will be able to improve knowledge on general viticulture and vineyard management issues even not discussed during class by consulting handbooks, specific websites as well as scientific and technical journals.

***COURSE CONTENT***

*Lectures*

|  |  |
| --- | --- |
| Topics | CFU |
| Botany and anatomy: root system and canopy structure: permanent organs, shoot, leaf, bunch, and berry. Phenology and growth cycle. Reproductive cycle: bud differentiation, blooming and fruit-set. The concept of bud fruitfulness. | 1 |
| Gas exchange. Variation of photosynthesis pattern as affected by sunlight, temperature, and leaf age. Water relations and water use efficiency. *Source-sink* balance and canopy efficiency. | 1 |
| Berry development and ripening: anatomical, physiological, and biochemical aspects. Definition and assessment of grape maturity and harvesting. | 0,5 |
| Grapevine propagation and vineyard planting: choice of plant material, trellis material and accessories, vine spacing. Floor management: sod, tillage, mulching, herbicides. Fertilization and Irrigation. | 1 |
| Winter pruning: physiological principles, bud load assessment, modality of pruning. Training systems for the grapevine: classification, choice criteria, management. | 1 |
| Canopy management and summer pruning: desuckering, shoot thinning, shoot positioning, shoot trimming, leaf removal, and cluster thinning. | 0,5 |
| Tutorials. Assessment of grapevine morphology, phenological stages, and canopy characterization. Characterization of the physiological status. Canopy management and summer pruning technical visit in vineyard. | 1 |

### **READING LIST**

S. PONI.Designing and managing a sustainable vineyard in a climate change scenario. Available online on Amazon*, 2022,* self-published.

CREASY G.L., CREASY L.L. Grapes. 2nd Edition, CABI, Boston, MA, 2018

M. KELLER. The science of grapevines. Elsevier, 2010.

P. ILAND, P. DRY, D. PROFITT, S. TYERMAN. The Grapevine: from the science to the practice of growing vines for wine. P. Iland Wine Promotion, 2012.

A. PALLIOTTI, S. PONI, O. SILVESTRONI, Manuale di viticoltura, Edagricole-New Business Media, 2018. (In Italian).

Additional reading materials will be handed out during the course. Documents and teaching materials will be shared using the Blackboard platform.

***TEACHING METHOD***

The teaching method will embrace the following activities:

1) Indoor class where main course topics will be covered along with several applied examples. Interactions between teacher and students will be promoted by stimulating discussion of specific case studies.

2) Indoor and outdoor (i.e. laboratory, greenhouse, field) practical activities and exercises related to assessment of main phenological stages, shoot fruitfullness, and canopy density. Students will be able to test equipments for assessing the plant physiological status (leaf gas-exchange, water potential and greenness index), and will perform some canopy manipulations.

3) Field visits for a better appreciation of the wine value chain oriented to the production of sparkling vs. still, white vs. red wines.

***ASSESSMENT METHOD AND CRITERIA***

Student’s performance will be assessed through a final written exam by combining multiple-choice and open questions; 16 multiple-choice questions will be valued a maximum score of 16 (true answer = 1 each). Additional 3 open questions with 4 rows available per each answer will be scored on a 0–5 scale corresponding to a maximum score of 15. Score will reflect the following items: a) knowledge of the subject; b) language clarity; c) ability to make connections between different topics. Final score will be the sum of the two section scores and will be expressed on a 0–30 *cum laude* scale. Indicator of success : Score ≥18/30.

***NOTES AND PREREQUISITES***

Participation at tutorials and technical field trip is recommended. Time schedule and location for students’ colloquia : everyday after class at the Department of Sustainable Crop Production (DI.PRO.VE.S.) – Section of Fruit Culture and Viticulture (office 313).