

## Department:

Viticulture and Enology

## Course Description:

This course is designed to provide students with an understanding of the principles of grape juice and wine analysis and the reasons for use of each analysis. Analyses of a practical and useful nature are chosen for the laboratory exercises demonstrating various chemical, physical and biochemical methods. Students will participate in workshops and hands-on experiences at participating wineries.

## Course Competencies:

Upon completion of the course, the student should be able to:

1. List the proper personal protective equipment (PPE).
2. Describe the proper techniques for mixing chemicals.
3. Describe the proper techniques for smelling chemicals.
4. Describe the proper techniques for transferring chemicals.
5. Describe the importance of quality control.
6. Explain applicable governmental and trade regulations.
7. List the eight basic laboratory tests.
8. List advanced tests.
9. Describe what testing should be done and explain why.
10. Describe the sampling techniques of grapes for harvest analysis.
11. Describe and demonstrate the process for Sugar (Brix) testing using refractometer.
12. Describe the process for testing for pH.
13. Describe the process for titratable acidity.
14. Describe the process for testing for berry aroma.
15. Describe the process for testing for phenolic maturity.
16. Describe the process for determining the acid profile – tartaric, malic and citric.
17. Describe the process for testing for the presence of materials other than grapes (MOG).
18. Describe the sampling technique for disease assessment and chemical analysis.
19. Describe the process for testing for yeast available nitrogen.
20. Describe the process for testing for volatile acidity.
21. Describe the process for testing for malolactic acid fermentation.
22. Describe the optional microbial tests that could be done and explain why.
23. Describe the process for testing for free and total sulfur dioxide.
24. Describe the process for testing for residual sugar.
25. Describe the testing for heat stability.
26. Describe the testing for cold stability.

27. Describe the testing for dissolved oxygen.
28. Describe the testing for sulfide detection/treatment.
29. Describe the testing for fining trials and acid adjustment trials.
30. Describe the testing for Brettanomyces culture and 4-ethyl phenol.
31. Describe the testing for cork analysis.
32. Describe the testing for bottle sterility.
33. Set up equipment for testing and analysis.
34. Prepare reagents and chemicals.
35. Follow test procedure.
36. Record the results.
37. Analyze the data.

### Course Content:

- A. Rationale for Analysis in Production of Wines: Pre-Harvest, Pre-Fermentation, Fermentation, Storage, Pre-Bottling, Post-Bottling
- B. Grape Maturity: Soluble Solids/Degree Brix, Sugar Per Berry
- C. Refractometry and Hydrometry Techniques
- D. pH and Titratable Acidity (TA): Acids, Bases, Normality vs. Molarity, Grape/Wine Acids, Hydrogen Ion Concentration, pH Measurements, TA Measurements, Standardization of NaOH
- E. Pre-Fermentation, Acid Additions, Nutritional Status of Grape Juice, The Formol Method
- F. Sulfur Dioxide and Methods of Determination
- G. Methods of Determination of Alcohol, Gas Chromatographic Techniques for Alcohol, Fusel, Oils
- H. Gas Chromatography/Mass Spectrometry
- I. Volatile Acidity and Extract
- J. Residual Sugar (Lane Eynon, Rebelein Methods)
- K. Malic Acid (Paper Chromatography and Enzyme Methods)
- L. Cold Stability and Heat Stability Determination
- M. Basic Spectrometry
- N. Testing for Corks
- O. Atomic Absorption Techniques for Metals
- P. Testing for Dissolved Oxygen, Sulfides and Brettanomyces

### Learning Assessments:

Course competencies will be assessed by use of portfolios and presentations, written examinations, laboratory and field observations, class projects and activities, active participation in course dialog, and scholarly activities including discovery, application, and integration.

## Instructional Materials:

Basic Wine Analysis (DVD), Rey, 2003. Reference: Any Quantitative Analysis Textbook.

### **Guidelines for Requesting Accommodations Based on Documented Disability or Medical Condition**

It is the intention of Highland Community College to work toward full compliance with the Americans with Disabilities Act, to make instructional programs accessible to all people, and to provide reasonable accommodations according to the law.

Students should understand that it is their responsibility to self-identify their need(s) for accommodation and that they must provide current, comprehensive diagnosis of a specific disability or medical condition from a qualified professional in order to receive services. Documentation must include specific recommendations for accommodation(s). Documentation should be provided in a timely manner prior to or early in the semester so that the requested accommodation can be considered and, if warranted, arranged.

In order to begin the process all students **must** complete the "Disabilities Self-Identification Form" at this link:  
<https://highlandcc.edu/pages/disability-services>.

This form can also be accessed at the Highland Community College homepage under Students Services/Student Resources/Disability Service or by contacting the Disabilities Coordinator.