

Las Positas College  
3000 Campus Hill Drive  
Livermore, CA 94551-7650  
(925) 424-1000  
(925) 443-0742 (Fax)

## Course Outline for VWT 21

### APPLIED ENOLOGY

Effective: Fall 2018

#### I. CATALOG DESCRIPTION:

VWT 21 — APPLIED ENOLOGY — 3.00 units

This is a fundamental course in the science and art of winemaking focusing on grape and wine chemistry, basic grape processing and wine production from vineyard to bottle. Lectures will build on the development of wine from the components in grapes through maturation, including ripeness parameters, pre and post fermentation management, alcoholic and malolactic fermentation. There will be a focus on wine health and integrity, the role and behavior of compounds found in musts and yeasts, and the relationship between wine and oak. There will be a strong emphasis on analytical methods and practical skills. Students under the age of 21 must have a declared major of either viticulture and/or enology to participate in any tasting activities as stated in the California State Assembly Bill 1989.

2.50 Units Lecture 0.50 Units Lab

#### **Strongly Recommended**

VWT 20 - Introduction to Enology  
with a minimum grade of C

#### **Grading Methods:**

Letter Grade

#### **Discipline:**

- Agriculture Production

	<b>MIN</b>
<b>Lecture Hours:</b>	45.00
<b>Expected Outside of Class Hours:</b>	90.00
<b>Lab Hours:</b>	27.00
<b>Total Hours:</b>	162.00

#### II. NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: 1

#### III. PREREQUISITE AND/OR ADVISORY SKILLS:

**Before entering this course, it is strongly recommended that the student should be able to:**

##### A. VWT20

1. characterize grape varieties used for wine production;
2. explain traditional European wine styles and how they might differ from domestic wine styles;
3. provide an objective assessment of wine including wines that are actively fermenting, unfinished, finished, young, aged, flawed and sound using a learned method of sensory evaluation;
4. describe climatic specifics of world wide wine producing regions including California;
5. explain how climate, soils and topography influence wine quality;
6. outline the process of fermentation;
7. detail the specifics of fermentation chemistry including yeast and bacterial driven fermentations;
8. describe grape processing and the equipment used for crushing and pressing;
9. explain the processing options of pre and post fermentation treatment of wines;
10. detail the vessel options for wine storage and aging;
11. describe the pre-bottling practices of wine racking, filtration, and fining;
12. describe winery sanitation practices and winery safety protocols;
13. analyze the smell and taste of wine using organoleptic skills.

#### IV. MEASURABLE OBJECTIVES:

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

- A. Explain the major constituents of wine
- B. Describe the process of winemaking
- C. Use a refractometer to measure degrees brix and a pH meter to measure titratable acid, and explain how the "brix to acid ratio" governs the decision when to harvest

- D. Explain methods to process white grapes
- E. Explain methods to process red grapes
- F. Describe how to manage red grape must prior to fermentation
- G. Describe the steps necessary to initiate primary fermentation
- H. Describe the steps necessary to initiate secondary fermentation
  - I. Compare and contrast the visual, olfactory, and palate impacts of different aging vessels
- J. Using the aeration/oxidation method, analyze a wine's free and total SO<sub>2</sub> and explain the role SO<sub>2</sub> plays in wine
- K. Demonstrate safe handling and operation of a flexible impeller pump
- L. Demonstrate how to correctly connect winery hoses using sanitary fittings and gaskets
- M. Describe the difference between fining and filtering wine
- N. Explain the process of cold stabilization
- O. Demonstrate the safe operation of a bottling line
- P. Explain oxygen ingress and how it impacts quality

## V. CONTENT:

- A. The major constituents of wine
  - 1. the acids in wine
  - 2. the sugars in wine
  - 3. starches and proteins found in wine
  - 4. phenolics and anthocyanins in red wine
- B. The basics of red and white wine grape processing
  - 1. ripeness parameters in the vineyard
  - 2. harvest practices
  - 3. red and white grape processing
  - 4. pre and post fermentation handling of red grapes
  - 5. must adjustments
  - 6. yeast selections and additions
  - 7. temperature control
  - 8. pressing
  - 9. moving wine from tank to barrel
  - 10. bottling practices
- C. Brix to acid ratio
  - 1. measuring ripeness using a refractometer
  - 2. measuring titratable acidity through manual titration and digital analysis
- D. Processing white grapes
  - 1. maceration protocols
  - 2. destemming to whole berries
  - 3. retaining whole clusters
- E. Processing red grapes
  - 1. maceration protocols
  - 2. destemming to whole berries
  - 3. retaining whole clusters
- F. Pre-fermentation management of red must
  - 1. must adjustments
  - 2. pre-fermentation maceration
  - 3. SO<sub>2</sub> adjustments
  - 4. temperature control
  - 5. eliminating the threat of oxidation during cold soak
- G. Fermentation (red and white)
  - 1. yeast selections
  - 2. yeast hydration protocols
  - 3. pitching the yeast
  - 4. temperature controls
- H. Secondary fermentation
  - 1. during or after initial fermentation
  - 2. ML bacteria strains
  - 3. temperature impacts on malolactic fermentation
  - 4. SO<sub>2</sub> impact on malolactic fermentation
  - 5. sensory evaluation during malolactic fermentation
- I. Aging wines (red and white)
  - 1. maintaining wine health throughout the aging process
  - 2. aging wines in stainless steel
  - 3. aging wine in concrete
  - 4. aging red and white wines in oak
  - 5. the impacts of new and used oak barrels
    - a. visual
    - b. olfactory
    - c. palate
    - d. texture
  - 6. oak alternatives
- J. The role of SO<sub>2</sub> and its impact on:
  - 1. wine health
  - 2. pH
  - 3. TA
- K. The safe handling and operation of winery pumps and hoses
  - 1. must pump
  - 2. diaphragm pump
  - 3. flexible impeller pump
  - 4. bulldog pup
- L. Hose connections
  - 1. tri-clover/sanitary fitting
  - 2. gasket materials
- M. Fining and filtering white wines
  - 1. fining materials
  - 2. filters and media
- N. Cold stabilization of white wines
  - 1. temperature parameters
  - 2. measuring results
- O. Bottling wines

1. setting up a bottling line
  2. rinsing and inert gas sparging
  3. sanitizing the reservoir and the filling spouts
  4. adjustments to the vacuum corks
  5. setting up a foil capsule spinner
  6. adjusting the automatic labeller
- P. Oxygen ingress
1. Understanding the hazards
  2. how to protect against it

#### VI. METHODS OF INSTRUCTION:

- A. **Lab** -
- B. **Projects** -
- C. **Lecture** -
- D. **Guest Lecturers** -
- E. **Classroom Activity** -
- F. **Demonstration** -
- G. **Audio-visual Activity** -

#### VII. TYPICAL ASSIGNMENTS:

- A. Read "The Seven Functions of Oak" and complete the homework questions.
- B. Write a one page research paper on using a concrete egg for fermentation and aging.
- C. Prepare to rack wine out of the stainless steel column.
  1. gather all required connections;
  2. connect one side of the flexible impeller pump to the stainless steel column;
  3. connect the other side of the flexible impeller pump to the filling wand;
  4. perform the assigned task.
- D. Working with your assigned group, taste each of the 4 supplied wines and identify the faults featured in each wine.
- E. For your final project, research a winemaker (past or present) and present your findings to the class on what you feel sets them apart from others in the industry.

#### VIII. EVALUATION:

##### A. **Methods**

1. Exams/Tests
2. Quizzes
3. Papers
4. Projects
5. Class Participation
6. Home Work
7. Final Public Performance

##### B. **Frequency**

1. At least two exams/tests/quizzes per semester
2. At least one written paper (approximately 2-4 pages) per semester
3. At least one group project per semester
4. Daily class participation
5. Weekly homework
6. Final presentation of group project

#### IX. TYPICAL TEXTS:

1. Considine, John , and Elizabeth Frankish. *A Complete Guide to Quality in Small Scale Wine Making*. 1st ed., Academic Press, 2014.
2. Smith, Clark. *Post Modern Wine Making; Rethinking the Modern Science of an Ancient Craft*. 1st ed., University of California Press, 2014.
3. Hudelson Phd, John. *Wine Faults; Causes, Effects and Cures*. 1st ed., Board and Bench Publishing, 2010.
4. Grainger, Keith , and Hazel Tattersall. *Wine Production and Quality*. 2nd ed., Wiley Blackwell, 2016.
5. Jackson, Ronald . *Wine Science; Principles and Applications*. 4th ed., Academic Press, 2014.
6. Goode, Jamie . *The Science of Wine: From Vine to Glass*. 1st ed., University of California Press, 2014.
7. Robinson, Jancis, and Julia Harding. *The Oxford Companion to Wine*. 4th ed., Oxford University Press, 2015.
8. Feiring, Alice, and Pascaline Lepetit. *The Dirty Guide to Wine: Following Flavor from Ground to Glass*. 1st ed., Countryman Press, 2017.
9. "Wine Business Monthly." 2017.
10. "Practical Vineyard and Winery." 2017.

#### X. OTHER MATERIALS REQUIRED OF STUDENTS:

- A. Student must have access to a computer and internet for research purposes
- B. Chemical splash goggles