

VIT_ENOL 113 – INTRODUCTION TO VINES AND WINES

Fall Semester 2018

INSTRUCTORS: Dr. James Harbertson (372-7506), WSU Wine Science Center, Room 239C, 359 University Drive, Richland, WA 99354-1671, jfharbertson@wsu.edu
Dr. Markus Keller (786-9263), WSU Irrigated Agriculture Research and Extension Center, Room V128, 24106 N. Bunn Road, Prosser, WA 99350, mkeller@wsu.edu
Alternate location for Dr. Keller weeks 1-7: WSU Wine Science Center, Room 243, 359 University Drive, Richland, WA 99354-1671 (372-7548)

OFFICE HOURS: Tuesday 1:15 – 2:15 p.m.

TIME/PLACE: Tuesday/Thursday 12:00 – 1:15 p.m.
Pullman: FSHN T101
Tri-Cities: TWSC 202

No textbook required

Recommended textbook: Jackson, R.S. 2014. Wine Science: Principles and Applications, 4th Edition. Elsevier Academic Press, London, UK, ISBN-13: 978-0123814685. Available on Amazon for \$100.

Suggested reference text: Johnson, H. and Robinson, J. 2013. The World Atlas of Wine, 7th Edition. Mitchell Beasley, London, UK, ISBN-13: 978-1845336899. Available on Amazon for \$40.

PREREQUISITES: None

COURSE DESCRIPTION:

This course will provide an introduction to viticulture (grape growing) and enology (wine making) and help students understand more about wine.

COURSE OBJECTIVES:

Develop an understanding of the importance of both viticulture and enology in the final quality of wine. Students will learn about various topics from WSU faculty involved in the WSU Viticulture & Enology Program, as well as guest speakers.

- Learn about the history, culture, and health aspects of wine
- Learn about the wine growing regions of the world, including the United States
- Learn about wine grape varieties and their characteristics
- Understand the main environmental and viticultural inputs into wine making
- Understand the basic elements of wine fermentation and the responsible organisms
- Understand the processes and equipment involved in wine production
- Understand the potential beneficial and detrimental impacts of wine consumption on human health
- Understand the importance of sensory evaluation of wines
- Develop communication and writing skills
- Develop technical skills for using and evaluating information.

CLASS ATTENDANCE AND PARTICIPATION:

Students must attend each class and actively participate in class discussion. Attendance will be taken at random times throughout the semester.

COURSE ASSESSMENTS:

The course will be comprised of lectures, exams, and a written assignment. The assignment will summarize a published paper in the fields of viticulture or enology; instructions are below. Lecture materials and e-mail are posted through the class learning site on BB learn. University of Idaho students have been provided access through their "Friends of WSU" accounts. The URL for BB learn is <https://learn.wsu.edu>.

EXAM POLICY:

Make-up exams are not given. If you anticipate missing an exam because of an emergency, please contact one of the instructors at your earliest convenience. You must give the instructor notice before the scheduled exam. If you are ill the day of the exam, you are still required to notify the instructor prior to the scheduled exam. Failure to notify the instructor in advance will result in a "0" for that exam.

LECTURE SCHEDULE:

Part I: The Vineyard (Weeks 1-7)

- A. History & Culture of Grapes & Wine
- B. Botany & Structure of Grapevines
- C. Grape Varieties & Rootstocks
- D. Grapevine Growth Cycle
- E. Viticulture: Growing Grapes
- G. Pest Management
- F. Environmental Impacts on Grape Production
- H. Grape Berry Development & Composition
- I. Harvesting & Picking Decisions

Part II: The Winery (Weeks 8-16)

- J. Wine Microorganisms & Fermentation
- K. Wine Making Introduction
- L. White Wine Making
- M. Red Wine Making
- N. Sparkling Wine Production
- O. Fortified Wine & Brandy Production
- P. Wine and Health
- Q. Geography of Wine (Old World, New World, United States)
- R. Sensory Evaluation of Wine
- S. Introduction to Wine Tasting

Important Dates to Remember:

- September 9: Last day to withdraw (without fee)
- October 2: Test 1 (Viticulture)
- November 1: Selection of paper due as BB learn message (<https://learn.wsu.edu>)
- November 19-23: Thanksgiving Vacation
- November 29: Test 2 (Enology)
- December 6: Paper summary due on BB learn (<https://learn.wsu.edu>)
- December 14: FINAL EXAM, 8:00 – 10:00 am ([WSU Final Exam Schedule](#))

GRADING:

Tests (100 points each)	200 points
Final exam	200 points
Written assignment	100 points
Total:	500 points

<u>Grade</u>	<u>% of Total Points</u>
A	≥93.0
A-	90.0 - 92.9
B+	87.0 - 89.9
B	83.0 - 86.9
B-	80.0 - 82.9
C+	77.0 - 79.9
C	73.0 - 76.9
C-	70.0 - 72.9
D+	67.0 - 69.9
D	60.0 - 66.9
F	≤59.9

PAPER SUMMARY (WRITTEN ASSIGNMENT):

This project will be worth 100 points and will be graded on completeness and accuracy of the information, writing skills and mechanics, and completion of all components of the assignment. Select one of the papers (your choice) found on the final pages of the syllabus* and declare your selection as a message on BB learn (<https://learn.wsu.edu>) by November 1. Read the paper and write a brief summary, which is due on December 6, to answer the following basic questions:

- Why was the research done?
- How did they do it?
- What did it demonstrate?
- What is the significance of the research?

Your submission should be a one-page summary, single spaced with a 12-point font type and 1.0-inch margins. Include, as a reference at the end of your report, the authors who wrote the paper you are summarizing, its title, journal name, volume, and page numbers. Use the paper itself as an example for proper referencing. Similarly acknowledge all other sources of information you use. You will need to find the article either at the library or through the WSU Library website (<https://libraries.wsu.edu>). To submit your summary you must convert it to a PDF (.jpeg not accepted) and attach it to the submission page using the BB learn website for the course (<https://learn.wsu.edu>). This can be found by clicking on Written Assignment and scrolling down to Assignment Submission – Attach File – Browse My Computer.

Grading criteria used for final paper:

Writing skills and mechanics	30 points
Accuracy of information	30 points
Completeness of required information	40 points
Total	100 points

Late submissions will lose 10% of the possible points for each day the paper is late.

ACADEMIC ETIQUETTE:

Please do not carry on side conversations or read the newspaper during class. Please turn off smartphones, laptops and other personal electronic devices during class. Web surfing and text messaging during class are *rude and prohibited*.

ACADEMIC INTEGRITY:

Academic integrity is the cornerstone of higher education. As such, all members of the university community share responsibility for maintaining and promoting the principles of integrity in all activities, including academic integrity and honest scholarship. Academic integrity will be strongly enforced in this course. Students who violate WSU's Academic Integrity Policy (identified in Washington Administrative Code (WAC) 504-26-010(3) and -404) will fail the course or fail the assignment, will not have the option to withdraw from the course pending an appeal, and will be reported to the Office of Student Conduct. Cheating includes, but is not limited to, plagiarism and unauthorized collaboration as defined in the Standards of Conduct for Students, WAC 504-26-010(3). You need to read and understand all of the definitions of cheating: <http://app.leg.wa.gov/WAC/default.aspx?cite=504-26-010>. If you have any questions about what is and is not allowed in this course, you should ask course instructors before proceeding. If you wish to appeal a faculty member's decision relating to academic integrity, please use the form available at conduct.wsu.edu.

SAFETY AND EMERGENCY NOTIFICATION:

Classroom and campus safety are of paramount importance at Washington State University, and are the shared responsibility of the entire campus population. WSU urges students to follow the "Alert, Assess, Act," protocol for all types of emergencies and the "[run, hide, fight](#)" response for an active shooter incident. Remain alert (through direct observation or emergency notification), assess your specific situation, and act in the most appropriate way to assure your own safety (and the safety of others if you are able). Please sign up for emergency alerts on your account at *MyWSU* to receive notification regarding campus emergencies (including campus closures). For more information on this subject, campus safety, and related topics, please view the [FBI's run, hide, fight video](#) and visit the [WSU safety portal](#).

Emergency Evacuations (for Tri-Cities students). If the alarm sounds, everyone must leave the building. Try to stay together. Your instructor will be the last one to exit the room, close the door(s), and direct you to the assembly areas. If any student is unable to evacuate, please notify immediately the evacuation coordinator (who will be wearing a green vest). The assembly areas are:

- East/Floyd and BSEL: blue emergency pole located directly south of the BSEL sidewalk, parking row 6.
- CIC: blue emergency pole in row 1, directly down the diagonal sidewalk from the main entrance.
- Wine Science Center: the WSU sign at the corner of University & George Washington Way
- ICB: south edge of parking lot
- Nursing: southeast corner of parking lot, near Chapala Express
- Student Union Building: Rotary Stage

SAFETY POLICY:

Washington State University is committed to maintaining a safe environment for its faculty, staff, and students. Safety is the responsibility of every member of the campus community and individuals should know the appropriate actions to take when an emergency arises. Please consult:

WSU Pullman Campus Safety Plan at: <http://safetyplan.wsu.edu>

WSU Tri-Cities Campus Safety Plan at: <http://www.tricity.wsu.edu/disability>

WSU Emergency Management web site: <http://oem.wsu.edu/emergencies>

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ACCOMODATIONS:

Reasonable accommodations are available for students with documented disabilities or chronic medical conditions. If you have a disability and need accommodations to fully participate in this class, please visit the Access Center website to follow published procedures to request accommodations: <http://www.accesscenter.wsu.edu>. You may also either call or visit the Access Center in person to schedule an appointment with an Access Advisor. Pullman Location: Washington Building 217; Phone: 509-335-3417. Tri-Cities resource: Gaby Corona in TFLO 269, 372-7352, gabriella.corona@wsu.edu. You will need to provide your instructor with the appropriate accommodation form. Late notification could cause a potential delay in accommodations. All accommodations must be approved through the Access and Support Services Coordinator.

CH2M STEM Tutoring Center. Free tutoring in math, biology, chemistry and physics, on a drop-in basis is available for undergraduate students. The center is located adjacent to the Advising Center on the second floor of the Max E. Benitz library. The tutoring center will open on Tuesday September 4th.

The Writing Center (located on the second floor of the Max E. Benitz library) offers free writing support to all Washington State University students. Our Writing Center consultants—undergraduate and graduate students at WSUTC themselves—can help you with various writing issues you may encounter, from generating ideas to revision. I urge you to meet with different consultants and find one with whom you work well, as students have found that the one-on-one attention available in the Writing Center can be very helpful for their writing process. Although you may walk in for assistance at any time, scheduling an appointment is encouraged. When you schedule an appointment, you may select the specific day and time of your consultation, and you are guaranteed at least 30 minutes of one-on-one time with the peer writing consultant of your choice. Schedule an appointment at: <https://tricity.mywconline.com>.

Important financial aid deadlines:

- October 1, FAFSA and WASFA open for the 2019-2020 academic year.
- November 30, Priority Deadline for FAFSA and WASFA for the 2019-2020 academic year.
- January 31, Scholarship Application Deadline for the 2019-2020 academic year.

IMPORTANT: Per WSU policy the instructors will **ONLY** be able to respond to emails sent from your WSU email address. We will **NOT** be able to respond to emails sent from your personal email address.

SYLLABUS CHANGES DISCLAIMER:

The instructors reserve the right to alter the syllabus via class announcements or email.

***Papers for Written Assignment (in alphabetic order by first author)**

1. Anderson K. 2014. Changing varietal distinctiveness of the world's wine regions: evidence from a new global database. *J. Wine Econ.* 9: 249-272.
2. Barnard H., Dooley A.N., Areshian G., Gasparyan B., and Faull K.F. 2011. Chemical evidence for wine production around 4000 BCE in the Late Chalcolithic Near Eastern highlands. *J. Arch. Sci.* 38: 977-984.
3. Casassa L.F., C.W. Beaver, M. Mireles, R.C. Larsen, H. Hopfer, H. Heymann, and J.F. Harbertson. 2013. Influence of fruit maturity, maceration length, and ethanol amount on chemical and sensory properties of Merlot wines. *Am J Enol Vitic* 64:437-449.
4. Chapman D.M., Matthews M.A., and Guinard J.X. 2004. Sensory attributes of Cabernet Sauvignon wines made from vines with different crop yields. *Am. J. Enol. Vitic.* 55: 325-334.
5. de la Garza F. and R.B. Boulton. 1984. The Modeling of Wine Filtrations. *Am. J. Enol. Vitic.* 35:189-195.
6. Dry P.R., Longbottom M.L., McLoughlin S., Johnson T.E., and Collins C. 2010. Classification of reproductive performance of ten winegrape varieties. *Aus. J. Grape Wine Res.* 16: 47-55.
7. Ferguson J.C., Moyer M.M., Mills L.J., Hoogenboom G., and Keller M. 2014. Modeling dormant bud cold hardiness and budbreak in twenty-three *Vitis* genotypes reveals variation by region of origin. *Am. J. Enol. Vitic.* 65: 59-71.
8. Fischer U., and A.C. Noble. 1994. The effect of ethanol, catechin concentration, and pH on sourness and bitterness of wine. *Am J Enol Vitic* 45:6-10
9. Herrera J.C., Hochberg U., Degu A., Sabbatini P., Lazarovitch N., Castellarin S.D., Fait A., Alberti G., and Peterlunger E. 2017. Grape metabolic response to postveraison water deficit is affected by interseason weather variability. *J. Agric. Food Chem.* 65: 5868-5878.
10. Huber F., Röckel F., Schwander F., Maul E., Eibach R., Cousins P., and Töpfer R. 2016. A view into American grapevine history: *Vitis vinifera* cv. 'Sémillon' is an ancestor of 'Catawba' and 'Concord'. *Vitis* 55: 53-56.
11. Jones G.V., Duff A.A., Hall A., and Myers J.W. 2010. Spatial analysis of climate in winegrape growing regions in the western United States. *Am. J. Enol. Vitic.* 61: 313-326.
12. Keller M., Pool R.M., and Henick-Kling T. 1999. Excessive nitrogen supply and shoot trimming can impair colour development in Pinot Noir grapes and wine. *Aus. J. Grape Wine Res.* 5: 45-55.
13. Keller M., Romero P., Gohil H., Smithyman R.P., Riley W.R., Casassa L.F., and Harbertson J.F. 2016. Deficit irrigation alters grapevine growth, physiology, and fruit microclimate. *Am. J. Enol. Vitic.* 67: 426-435.
14. Kliwer W.M., and Dokoozlian N.K. 2005. Leaf area/crop weight ratios of grapevines: influence on fruit composition and wine quality. *Am. J. Enol. Vitic.* 56: 170-181.
15. Kunkee R. E. , C. S. Ough, and M. A. Amerine 1964. Induction of Malo-Lactic Fermentation by Inoculation of Must and Wine with Bacteria. *Am. J. Enol. Vitic.* 15:178-183.
16. Kwasniewski M.T., Sacks G.L., and Wilcox W.F. 2014. Persistence of elemental sulfur spray residue on grapes during ripening and vinification. *Am. J. Enol. Vitic.* 65: 453-462.
17. Laidig F., Piepho H.P., and Hofäcker W. 2009. Statistical analysis of 'White Riesling' (*Vitis vinifera* ssp. *sativa* L.) clonal performance at 16 locations in the Rheinland-Pfalz region of Germany between 1971 and 2007. *Vitis* 48: 77-85.

18. Meloni G., and Swinnen J. 2016. The political and economic history of vineyard planting rights in Europe: from Montesquieu to the European Union. *J. Wine Econ.* 11: 379-413.
19. Mendez-Costabel M.P., Wilkinson K.L., Bastian S.E.P., McCarthy M., Ford C.M., and Dokoozlian N. 2013. Seasonal and regional variation of green aroma compounds in commercial vineyards of *Vitis vinifera* L. Merlot in California. *Am. J. Enol. Vitic.* 64: 430-436.
20. Myles S., Boyko A.R., Owens C.L., Brown P.J., Grassi F., Aradhya M.K., Prins B., Reynolds A., Chia J.M., Ware D., Bustamante C.D., and Buckler E.S. 2011. Genetic structure and domestication history of the grape. *Proc. Natl. Acad. Sci. USA* 108: 3530-3535.
21. Noble A. C., R. A. Arnold, B. M. Masuda, S. D. Pecore, J. O. Schmidt, and P. M. Stern. 1984. Progress Towards a Standardized System of Wine Aroma Terminology. *Am. J. Enol. Vitic.* 35:107-109.
22. Roujou de Boubée D. , A. M. Cumsille, M. Pons, and Denis Dubourdieu 2002. Location of 2-Methoxy-3-isobutylpyrazine in Cabernet Sauvignon Grape Bunches and Its Extractability during Vinification. *Am. J. Enol. Vitic.* 53:1-5.
23. Sherman E., Greenwood, D.R., Villas-Boâs S.G., Heymann, H., J.F. Harbertson. 2017. Impact of Grape Maturity and Ethanol Concentration on Sensory Properties of Washington State Merlot Wines. *Am. J. Enol. Vitic.* 68: 344-356.
24. Sivilotti P., Herrera J.C., Lisjak K., Èesnik H.B., Sabbatini P., Peterlunger E., Castellarin S.D. 2016. Impact of leaf removal, applied before and after flowering, on anthocyanin, tannin, and methoxypyrazine concentrations in 'Merlot' (*Vitis vinifera* L.) grapes and wines. *J. Agric. Food Chem.* 64: 4487-4496.
25. Tesic D., Keller M., and Hutton R. 2007. Influence of vineyard floor management practices on grapevine growth, yield, and fruit composition. *Am. J. Enol. Vitic.* 58: 1-11.
26. This P., Lacombe T., and Thomas M.R. 2006. Historical origins and genetic diversity of wine grapes. *Trends Genet.* 22: 511-519.
27. Walker G.A., A. Hjelmeland, N.A. Bokulich, D.A. Mills, S.E. Ebeler, and L. Bisson. 2016. Impact of the [GAR+] Prion on Fermentation and Bacterial Community Composition with *Saccharomyces cerevisiae* UCD932 *Am. J. Enol. Vitic.* 67:296-307.
28. White M.A., Diffenbaugh N.S., Jones G.V., Pal J.S., and Giorgi F. 2006. Extreme heat reduces and shifts United States premium wine production in the 21st century. *Proc. Natl. Acad. Sci. USA* 103: 11217-11222.
29. Wildenradt H. L. and V. L. Singleton. 1974. The Production of Aldehydes as a Result of Oxidation of Polyphenolic Compounds and its Relation to Wine Aging. *Am. J. Enol. Vitic.* 25:119-126.
30. Winterhalter P. , M. A. Sefton, and P. J. Williams 1990. Volatile C13-Norisoprenoid Compounds in Riesling Wine Are Generated From Multiple Precursors. *Am. J. Enol. Vitic.* 41:277-283.