

VE/HORT 326 – Vineyard and Winery Equipment Systems

Instructor:	Peter Hedges	Term:	Fall 2016
Class Time:	MW 11:10 – 12:00		
Room Assignment:	Lecture: PUL-TERR 106; TC-202W	Lab:	PUL- JSNH 398; TC-202W
Lab:	M 2:10 – 5:00 (TBD some weekends needed for trips)		
Mobile:	509-528-9955	E-Mail:	peter.hedges@wsu.edu
Office Hours:	Please contact Pete to arrange appointments		

Catalog Description:

This course provides an overview of machinery systems used in the vineyard and winery (3 units).
Prerequisite: Hort 313. 2 Field trips required on 9/24 & 10/22. All times and dates subject to change.

Course Purpose:

The purpose of this course is to offer the student background in the areas of:

1. Machinery used to establish vineyards, site preparation, mechanized cultural practices, and harvesting for production of wine grapes.
2. Basic winery equipment concepts including safety, materials and fittings, tanks, cooperage, pumps, filters, processing equipment, refrigeration, and bottling.

This course fulfills the 6 learning goals of the baccalaureate as outlined by the university (<https://my.wsu.edu/portal/>) including: 1) Critical and Creative Thinking; 2) Quantitative & Symbolic Reasoning; 3) Information Literacy; 4) Communication; 5) Self in Society; and 6) Disciplinary Speciality.

Course Objectives:

1. Provide students with information and understanding of the fundamentals of:
 - Viticulture operations and systems associated with grape production (1,2).
 - Winery operations including equipment systems for wine production (1,2).
2. Provide an understanding of quantitative process of vineyard and winery operations including:
 - Mechanical systems operation including basic principle in hydraulics (2).
 - Mass balance and physics of refrigeration and other winery systems (2).
 - Logistics of managing grapes and wine (3,4,5,6).
3. Provide opportunities for students to apply course concepts to real life applications through field and laboratory exercises and demonstrations (1,2,3,4,5).

Student Learning Outcomes, Knowledge and Skill Development

Upon successful completion of this course students will be able to:

1. Use a technology and science-based, decision-making approach to define essential components of vineyard and winery equipment for production of grapes and wine.
2. Integrate knowledge of technologies used to practice with the ability to communicate that knowledge effectively to others.
3. Demonstrate the ability to develop specific strategies for effectively communicating and managing production operations in the vineyard and winery.

Course Materials Include:

1. Description of mechanical systems used to grow and harvest grapes.
2. Explanation of winery equipment and operations.
3. Since class size is small the course materials will be emailed as needed. As available, course material will be posted to Blackboard.

4. **Field Trips:** Field trips will be scheduled to view vineyard mechanization systems and winery equipment, and harvest grapes.

Grading:	2 - Mid-Semester Examinations	40%
	1 - Comprehensive Final	40%
	Homework	20%

Grade Scale (%):	92.5-100 = A	90-92.4 = A-	87.5-89.9 = B+	82.5-87.4 = B
	80-82.5 = B-	77.5-79.9 = C+	72.5-77.4 = C	70-72.4 = C-
	60-69% = D	<60% = F		

Course Schedule

I. MECHANICAL VINEYARD CULTURAL OPERATIONS

1. Vineyard Site Selection and Planting
2. Tractors, 3 Point Hitch, Power Take Off
3. Sprayers and Sprayer Calibration
4. Canopy Management and Trellis Systems
5. Mechanical Pruning

II. MECHANICAL HARVESTING SYSTEMS FOR WINE GRAPES

6. Mechanical Harvesting of Wine Grapes
7. Types of Harvesters
8. Power Systems and Hydraulics
9. Harvester Efficiency

III. VINEYARD IRRIGATION SYSTEMS

10. Gravity Diversion Systems
11. Sprinkler Systems
12. Drip and Micro Sprayer Irrigation
13. Deficit Irrigation, RDI, PRD
14. Water and Plant status monitoring systems (neutron probes, irrometers, porometers, pressure chamber)

IV. INTRODUCTION TO WINERY EQUIPMENT

15. Review Winemaking Practices
16. Safety in the Winery
17. Fluid transfer and pipe sizing
18. Pumps, pump curves, sizing pumps
19. Piping, Fittings and Thread Standards

V. WINERY EQUIPMENT AND PROCESSING SYSTEMS

20. Refrigeration Systems for Wineries
21. Tanks
22. Cooperage, oak extraction chemistry, barrel storage and handling systems
23. Humidification Systems
24. Destemmers and Presses
25. Filtration Systems, Plate and Frame, Crossflow, Ultrafiltration
26. Reverse Osmosis, Spinning Cone
27. Bottling Lines
28. Accessory Systems – Electrical
29. Waste Water Systems, Discharge Limits, BOD, COD
30. HVAC, CO2 removal
31. Sanitizing Chemicals, wastewater implications, death kinetics, CIP systems

Please note that this is not a lecture to lecture mapping but a general list of topics to be covered. I may shift around topics as needed. If there is something specific that you want covered please let me know. I reserve the right to change topics and sequence of topics as needed.

Course Policies

Attendance and participation in class is expected and will contribute to final grade. Negligent attendance will affect your final grade.

Assignments are to be turned in at the beginning of the class period the day they are due. Late assignments will not be accepted, please plan accordingly.

- The schedule for this course is subject to change due to extenuating circumstances.
- Make-up of missed exams is contingent on making arrangements prior to the exam.
- Student must notify instructor 24 hours before any exam of any unforeseen circumstance resulting in a missed exam.
- The type of make-up exam will be oral, essay, or a combination of the two types.
- Makeup exam must be completed within one week of scheduled exam time.
- Students are responsible for all material in the handouts, slides, and reading assignments even if not covered in lecture.
- Cheating and plagiarism are serious academic offenses that benefit no one. The University Policy on Cheating and Plagiarism will be enforced in this classroom. The University Policy can be found at: www.conduct.wsu.edu/plagiarism/main.html and www.wsulibs.wsu.edu/plagiarism/main.html
- Disruptive behavior will not be tolerated and will be handled according to University Policy.
- Students must not wear shorts or opened toed shoes to any laboratory demonstrations.

Students with Disabilities: Reasonable accommodations are available for students with a documented disability. If you have a disability and may need accommodations to fully participate in this class, please visit the Disability Resource Center (DRC). All accommodations **MUST** be approved through the DRC (Washington Building, Room 217). Please stop by or call 509-335-3417 to make an appointment with a disability specialist. If you have any questions, please contact Rosie Pavlov at pavlovr@wsu.edu or 509-335-3417.