

Course Outline for HORT 53

LANDSCAPE AND VINEYARD PEST AND DISEASE MANAGEMENT

Effective: Fall 2018

I. CATALOG DESCRIPTION:

HORT 53 — LANDSCAPE AND VINEYARD PEST AND DISEASE MANAGEMENT — 3.00 units

This course covers concepts of plant pathology, entomology, and weed science which are studied in order to identify symptoms, diagnose problems, and determine methods of controlling plant diseases, insects, and weed pests. Also included is the study of the identification and biology of common vineyard, landscape and other horticultural crop pests and diseases. Materials and instruction is provided for techniques and strategies for sampling, monitoring and effective control measures, pest management strategies for insects, weeds and diseases, including bio-control, sustainable agriculture practices and integrated pest management. In addition to pesticide use, safety and compliance, there is a focus on preparation for the California State Qualified Applicators license. Students that take VWT 35 may not receive credit for HORT 53.

2.50 Units Lecture 0.50 Units Lab

Grading Methods:

Letter Grade

Discipline:

- Agriculture Production or
- Ornamental Horticulture

	MIN
Lecture Hours:	45.00
Expected Outside of Class Hours:	90.00
Lab Hours:	27.00
Total Hours:	162.00

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

III. PREREQUISITE AND/OR ADVISORY SKILLS:

IV. MEASURABLE OBJECTIVES:

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

- A. Explain the importance of pest management including how it can impact insects and their natural enemies, how plant diseases can be addressed, and pro-active/post emergent approaches to weed management
- B. Explain degree day accumulation and its relationship to disease and pest risk management
- C. Describe the vineyard yearly growth cycle and relate it to high and low risk periods of disease and pest pressure
- D. Describe the vine parts (roots, leaves, bearing wood, fruit) that are susceptible to viral diseases, and identify the markers on the infected plant, the vector, the control measures, and preventative practices
- E. Describe the vine parts (roots, leaves, bearing wood, fruit) that are susceptible to bacterial diseases, and identify the markers on the infected plant, the vector, the control measures and preventative practices,
- F. Describe the vine parts (roots, leaves, bearing wood, fruit) that are susceptible to fungal diseases, and identify the markers on the infected plant, the vector, the control measures and preventative practices
- G. Describe the vine parts (roots, leaves, bearing wood, fruit) that are susceptible to soil born pests, and identify the markers on the infected plant, the vector, the control measures, and preventative practices
- H. Describe the life-cycle of common vine canopy insects and mites, and identify the markers of an infected plant, the control measures, and preventative practices
 - I. Explain how natural enemies of vineyard pests are beneficial and help to control vine diseases
- J. Identify common vertebrate pests found in the vineyard, and describe associated hazards, markers of damage, control measures, and preventative practices
- K. Describe the life-cycle of common vineyard floor weeds, identify associated hazards, control measures, and vineyard floor management practices
- L. Explain the cultural concept of "sustainable" agriculture, and describe the various practices involved such as bio-control methods, organic farming, and integrated pest management
- M. Describe the different classes and regulation of pesticides including which agencies regulate pesticides, legal compliance and safe practices when transporting, mixing and applying pesticides, and pesticide sprayer calibration

V. CONTENT:

- A. Pest and Disease Management Overview
 - 1. Definitions
 - 2. Vocabulary
 - 3. Insects and natural enemies
 - 4. Disease biology
 - 5. Weed management
- B. Vine Structure and the Vineyard Yearly Growth Cycle
 - 1. Vine parts susceptible to infection and pest damage
 - 2. Vine cycle and periods of disease pressure
 - 3. Vine cycle and periods of pest pressure
- C. Degree Days
 - 1. Insect development
 - 2. Disease modeling for risk management
- D. Viral Diseases and Control Measures
 - 1. Leaf-roll viruses / vectors
 - 2. Fanleaf degeneration viruses / vectors
 - 3. Rugose wood viruses
 - 4. Viroids
- E. Bacterial Diseases and Control Measures
 - 1. Monitoring and sampling strategies
 - 2. Crown gall
 - 3. Pierce's Disease
 - 4. Vectors
- F. Fungal Diseases and Control Measures
 - 1. Powdery mildew
 - 2. Downy mildew
 - 3. Botrytis bunch rot
 - 4. Eutypa die-back
 - 5. Phomopsis cane and leaf spot
 - 6. Oak root fungus
 - 7. Trunk diseases
 - 8. Other
- G. Soil Pests and Control Measures
 - 1. Phylloxera
 - 2. Nematodes
- H. Insect and Mite Pests and Control Measures
 - 1. Leafhopper
 - 2. Sharpshooter
 - 3. Spider mites
 - 4. Mealybugs
 - 5. Orange Tortrix / Omniverous Leafroller
 - 6. Leafroller and Thrips
 - 7. Western Grapeleaf Skeletonizer
 - 8. Branch Twig and Cane Borer
 - 9. Cutworms
 - 10. Grape Bud Beetle
 - 11. False Chinch Bug
- I. Natural Enemies and Beneficial Insects
 - 1. Parasites and Parasitoids
 - 2. Crysoperla
 - 3. Hippodamia
 - 4. Trichogramma
 - 5. Cryptolaemus
 - 6. Anagrus
 - 7. Predacious mites
- J. Vertebrate Pests and Control Measures
 - 1. Deer
 - 2. Gophers
 - 3. Meadow Voles
 - 4. Squirrels
 - 5. Birds
 - 6. Pigs
 - 7. Rabbits
 - 8. Others
- K. Weeds and Control Measures
 - 1. Annuals vs. Perennials
 - 2. Spring/Summer Weeds vs. Winter Weeds
 - 3. Dicotyledonous Weeds vs. Monocotyledonous Weeds
- L. Sustainable Agricultural Practices/Bio-Control Methods/Organic Practices
- M. Pesticides
 - 1. Different classes of compounds
 - 2. Regulation and Regulatory Agencies
 - 3. Safety and Compliance
 - 4. Sprayer Calibration Text

VI. METHODS OF INSTRUCTION:

- A. **Lecture** -
- B. **Discussion** -
- C. **Observation and Demonstration** -
- D. **Field Trips** -
- E. **Audio-visual Activity** -

VII. TYPICAL ASSIGNMENTS:

- A. Read chapter 16 in your textbook on the life cycle of Oidium (powdery mildew) and answer the homework questions.
- B. Write a 2-page paper identifying a common vineyard pest and discuss an appropriate method of pest management.
- C. Research "capturing vineyard pests using pheromones" and present your findings in class.
- D. Set up a "sticky trap" and place it in an appropriate location to capture a specific vineyard pest. Explain your logic.

VIII. EVALUATION:

A. Methods

1. Exams/Tests
2. Quizzes
3. Papers
4. Field Trips
5. Group Projects
6. Class Participation
7. Home Work
8. Final 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 field trip to a vineyard site
4. At least one group project per semester
5. Daily class participation
6. Weekly homework
7. Final presentation of group project

IX. TYPICAL TEXTS:

1. - *Compendium of Grape Diseases, Disorders and Pests*. 2nd ed., The American Phytopathological Society, 2015.
2. *The Safe and Effective Use of Pesticides, 3rd Ed (Pesticide Application Compendium)*. 3rd ed., Univ of California - Agriculture & Natural Resources, 2016.
3. *Grape Pest Management*. 3rd ed., University of California - Agriculture and Natural Resources, 2013.
4. *Principles of Pesticides Use, Handling, and Application*. 1st ed., Bibliogov, 2013.
5. *Biocontrol of Major Grapevine Diseases: Leading Research*. 1st ed., CABI, 2016.

X. OTHER MATERIALS REQUIRED OF STUDENTS: