

# HORT 52H: HORTICULTURE PRACTICES: INTEGRATED PEST MANAGEMENT

## Foothill College Course Outline of Record

Heading	Value
<b>Units:</b>	3
<b>Hours:</b>	2 lecture, 3 laboratory per week (60 total per quarter)
<b>Advisory:</b>	Completion of or concurrent enrollment in HORT 15 strongly recommended.
<b>Degree &amp; Credit Status:</b>	Degree-Applicable Credit Course
<b>Foothill GE:</b>	Non-GE
<b>Transferable:</b>	CSU
<b>Grade Type:</b>	Letter Grade (Request for Pass/No Pass)
<b>Repeatability:</b>	Not Repeatable

## Student Learning Outcomes

- Identify various plant diseases, insects, and weeds.
- Demonstrate skills in developing integrated pest management plans.

## Description

Problems of and control solutions for diseases, insects, and weeds in landscapes and gardens. Ecologically based Integrated Pest Management (IPM) practices for handling plant pathogens, insect infestations, and unwanted vegetation. Emphasis on identification, life cycles, and symptoms of diseases, insects, and weeds.

## Course Objectives

The student will be able to:

- Analyze the environmental and economic conditions that have led to pest problems.
- Review pest characteristics, such as anatomy, physiology and identification.
- Integrate pest management control strategies (tools and techniques).
- Utilize monitoring, sampling methods, and protocols for decision-making.
- Examine selection criteria and formulate an IPM/EBPM program.
- Discuss health issues with pesticide use, including degradation, risk versus hazards, reduction of risk, and reduction of pesticide impacts on non-target organisms.
- Communicate with clients and educate them on the benefits and shortcomings of an IPM program.
- Examine pest control from different cultural backgrounds.

## Course Content

- Creation of pest problems (ecological and economic foundation)
  - Insect pest biology and identification
  - Insect population growth and natural control factors
  - Equilibrium level
  - Carrying capacity, economic injury level, and economic threshold
  - Equilibrium population density

- R and K strategies
- Review pest characteristics
  - Plant pathogen biology and identification
    - Pathogen structures (fungi, bacteria, viruses, etc.) (Lec)
    - Pathogen physiology: the infestation process (Lec)
  - Pathogen identification (Lab)
    - Pathogen sample collection and preparation (Lab)
    - Diagnosis (Lab)
  - Insect biology
    - Functional role of insects (Lec)
    - Insect morphology and physiology (Lec)
    - The insect pest concept (Lec)
  - Beneficial organisms (parasitic and predatory insects and nematodes) (Lec)
  - Plant morphology and biology (Lec)
    - Plant structure (Lec)
    - Plant physiology (Lec)
    - Physiology of plant reproduction (Lec)
  - Plant identification (sample collection and preparation) (Lab)
  - Ecology and control of plant pathogens, insects, and invasive plants
    - How a microbe becomes a pathogen: dissemination of plant pathogens (Lec)
    - How insects become pest problems for plants (Lec)
    - How a plant becomes a weed (Lec)
    - Plant health relative to disease and insect infestations (Lec)
    - Plant competition and weeds (strategies for weed survival) (Lec)
    - Environmental factors that pre-dispose plants to disease, insect, and weed infestations (Lec)
    - Insect monitoring techniques (Lab)
    - Genetics and insect management (Lec)
    - Habitat modification for weed management (Lab)
      - Vegetation management techniques (Lab)
      - Reducing propagule load (Lab)
    - Quality control of beneficial insects and nematodes (Lec)
    - Chemical, biological, and physical control of pathogens, insects, and weeds (Lec)
    - Mode of action of pesticides, insecticides, and herbicides (Lec)
    - Cultural control of plant pathogens, insects, and weeds (Lec)
  - Integrated pest management control strategies
    - Reduction or elimination of pests through environmental modification
      - Environmental modifications (cultural practices)
      - Exclusions
      - Monitoring
    - Biological control
      - Biological control agents (parasitoids and predators)
      - Synthetic chemical pesticides
      - Microbial pesticides
      - Transgenic plants
      - Mechanical and physical controls
    - Chemical control (Lec)
    - Integrated Insect Pest Management (IPM) (Lec)
    - Ecologically Based Pest Management (EBPM) (Lec)
  - Insect pest monitoring (Lec)
    - Sampling and recording methods (Lec)
    - Use of monitoring data and statistical concepts to make IPM decisions
    - Use of predictive tools in IPM
    - Pesticide resistance monitoring techniques (Lec)
  - Design and implementation of IPM and EBPM programs (Lec)
    - Planning
    - Implementing the programs
    - Health and biological concerns

- 4. Cost benefit analysis
- F. Risk management in pest management programs (Lec)
  - 1. Strategy based
  - 2. Input based
  - 3. Regulatory framework
  - 4. Risk vs. hazard analysis
- G. Communication with clients (Lec)
  - 1. Client expectations
  - 2. Production of reports and presentations to educate clients
  - 3. Presentation of data to clients
  - 4. Program evaluation and refurbishment
- H. Pest control cultural issues (Lec)
  - 1. Pest management standards in other countries
  - 2. Cultural differences regarding use of pesticides

## Lab Content

- A. Lab instruction using microscopes. Microscopic examination of:
  - 1. Plant diseases.
  - 2. Plant pests.
  - 3. Weeds having a deleterious affect on the environment or other plants.
- B. Field work in the collection of representative organisms. Labs focusing on:
  - 1. Diseases
  - 2. Plant Pests
  - 3. Weeds
- C. Lab demonstrations and practice of pest control mechanisms.
  - 1. Practical application of conventional, organic, and sustainable pest control systems.

## Special Facilities and/or Equipment

- A. Horticultural laboratory, sustainable garden, and related horticultural facilities and equipment.
- B. Students provide equipment and supplies to collect and observe diseases, insects, and weeds, including work boots, leather gloves and clothing for fieldwork.

## Method(s) of Evaluation

Methods of Evaluation may include but are not limited to the following:

Methods may include, but are not limited to:

- A. Term project
- B. Midterm exam
- C. Lab reports
- D. Final examination

## Method(s) of Instruction

Methods of Instruction may include but are not limited to the following:

- A. Lecture presentations on IPM.
- B. Slide or web presentations which assist in the identification of pests and diseases.
- C. Group discussions and examinations of common weeds, diseases, and pests.
- D. Classroom discussions and demonstrations of pest control mechanisms.
- E. Guest speakers.
- F. Field trips.

## Representative Text(s) and Other Materials

Radcliffe, Edward B. Integrated Pest Management, Concepts, Tactics, Strategies, and Case Studies. Cambridge University Press, 2012.

Dreistadt, Steve. Pests of Landscape Trees and Shrubs, An Integrated Pest Management Guide. 2nd ed. Berkeley, CA: University of California, 2004.

These are both seminal texts necessary to presenting IPM.

## Types and/or Examples of Required Reading, Writing, and Outside of Class Assignments

- A. Reading assignments will include reading approximately 30-50 pages per week from assigned text. Supplemental reading will be provided in hand-out form or through reference to online resources.
- B. Lectures will address reading topics and experiences of instructor. Classroom discussion and demonstrations in support of lecture topics will be provided.
- C. Guest speakers from industry will provide supplemental lecture and demonstration.
- D. Writing assignments include:
  - 1. Topical white papers

## Discipline(s)

Ornamental Horticulture