

Discipline: Agriculture	Sub-discipline: Environmental Horticulture
General Course Title: Integrated Pest Management in Environmental Horticulture	Min. Units: 3 Semester
Proposed Suffix: L	
<p>Course Description: Exploration, identification and control of major horticultural pests, including insects, weeds, and diseases; impact of pests on commercial nursery crops and the landscape is also discussed. Integrated pest management including cultural, biological, mechanical/physical, and chemical control methods is emphasized. Course is designed to assist students in preparing for California licensing examines in pest management. Laboratory required.</p>	
Required Prerequisites or Co-Requisites ¹	
Advisories/Recommended Preparation ²	
<p>Course Objectives: <i>At the conclusion of this course, the student should be able to:</i></p> <ul style="list-style-type: none"> • Explain the economic significance of pests on the environmental horticulture economy • Identify ecological principles as they relate to the concept of integrated pest management • Classify pests into the major taxonomic groups significant to environmental horticulture • Identify the major types of agricultural and landscape pests • Detect and analyze pest infestation damage caused by insects, weeds, diseases, and other common pests • Observe and identify significant anatomical features of pests using microscopes, hand lenses, or other diagnostic equipment • Demonstrate how to monitor pests in agricultural and landscape settings and produce a log of pest activity and population levels • Describe the basic procedures and practices of biological, cultural, mechanical/physical, and chemical pest control • Develop an integrated pest management strategy for a specific crop or landscape site • Compare the classifications and formulations of pesticides and their use in a pest control environment • Outline the basic laws and regulations governing the use of pesticides • Describe pest control related to organic operations • Describe how to prepare pesticides/spray equipment safely and accurately, and (using mock products) demonstrate the correct application of these materials • List methods for responding to accidents and environmental hazards involving pest control materials 	
<p>Course Content:</p> <ol style="list-style-type: none"> 1. Introduction: Pests in Our Environmental/Horticultural Economy <ol style="list-style-type: none"> a. Costs of pest damage, prevention, and control b. Integrated pest management (IPM) c. Laws and regulations 	

¹ Prerequisite or co-requisite course need to be validated at the CCC level in accordance with Title 5 regulations; co-requisites for CCCs are the linked courses that must be taken at the same time as the primary or target course.

² Advisories or recommended preparation will not require validation but are recommendations to be considered by the student prior to enrolling.

Integrated Pest Management in Environmental Horticulture (Content continued)

2. Ecological Principles Related to IPM Concept
 - a. Levels of Ecological Organization
 - Individual
 - Populations
 - Community
 - Ecosystem
 - b. Ecosystem Concept
 - Photosynthesis
 - Abiotic Components
 - Biotic Components
 - Trophic Structure
 - c. Managed Ecosystems
 - Climate effects
 - Equilibrium of pest populations
3. Pest Identification/Classification
 - a. Arthropods
 - b. Mollusks
 - c. Nematodes
 - d. Vertebrates
 - e. Weeds
 - f. Pathogens (disease causing agents)
 - Bacteria
 - Fungi
 - Viruses
 - g. Abiotic disorders
4. Monitoring Procedures
 - a. Monitoring Objectives
 - b. Sampling
 - Size and number of samples
 - Accuracy of sampling methods
 - c. Sampling methods
 - Visual
 - Knockdown techniques
 - Suction
 - Netting
 - Trapping
 - Damage estimates
 - d. Meteorological systems
 - e. Record-keeping methods
 - Graphs
 - Data sheets
 - Field maps
 - Computer database
 - f. Interpreting and Using Monitoring Results

**Integrated Pest Management in Environmental Horticulture
(Content continued)**

5. Management Procedures and Practices of IPM Programs
 - a. Biological
 - b. Cultural
 - c. Mechanical/Physical
 - d. Chemical
 - e. Organic

6. Pesticide Use
 - a. Laws and regulations
 - b. Pesticide label and signal words
 - c. Personal protective equipment and safety procedures

7. Health and Environmental Issues
 - a. Pesticide emergencies
 - b. Minimizing environmental risks

Laboratory Activities: Individual Laboratory Activities are designed to support course objectives.

Methods of Evaluation: Lecture
Comprehensive Quizzes and Exams
Written Critical Thinking Scenarios
Problem Analysis and Solution
Research and Term Papers

Methods of Evaluation: Laboratory
Laboratory Skill Validation by Observation
Laboratory Projects and Reports
Laboratory Research Projects and Reports
Laboratory Skill Practicum Exams

Typical Textbooks:

University of California. (2012) IPM in Practice: Principles and Methods of Integrated Pest Management, UC, #3418 (ISBN: 1-978-1-60107-785-1)

Pedigo, Rice, Rice, Entomology and Pest Management, Prentice Hall, NJ (2008) ISBN 13: 9780135132951

O’Conner-Marer, Patrick (2006) Landscape Maintenance Pest Control 1/E , University of California (ISBN: 10: 1879906-71-6)

Bohmont, Bert L. (2007) The Standard Pesticide User’s Guide, 7/E Prentice Hall, (ISBN: 10: 0-132187639)

Gill, Stanton, et al, (2006) Pests & Diseases of Herbaceous Perennials 2/E, Ball Publishing, Batavia, IL (ISBN: 1-883052-50-5)

References:

Norris, Robert F. Ph.D. Caswell-Chen and Kogan, (2003) Concepts of Integrated Pest Management, Prentice-Hall, NJ (ISBN:10: 0130870161)

The Illustrated Guide to Biological Pest Control, UC, #3386 (ISBN: 1-879906-41-4)

University of California. (1999) Pests of the Garden & Small Farm: A Grower’s Guide to Using Less Pesticide, UC, #3332, 2nd Edition (ISBN: 1-879906-40-6)

University of California. (1998) Natural Enemies Handbook:

Powell, Charles C. and Lindquist, Richard K. (1997) Ball Pest

and Disease Manual, 2nd Edition, Ball Publishing, Batavia, IL (ISBN: 1-883052-13)

Whitson, Tom D. Editor (2004) Weeds of the West 9th/E Western Society of Weed Science (ISBN: 0-7567-1182-7)

Cranshaw, Whitney (2004) Garden Insects of North America, Princeton University Press, Princeton, NJ (ISBN: Haggard, Peter & Judy H. (2006) Insects of the Pacific Northwest, Timber Press, Portland, Oregon (ISBN: 13: 978-0-88192-689-7)

Mac's Field Guide Chart on Garden Bugs, The Mountaineers Books, Seattle, WA (ISBN: 0-89886-711-8) (*Note: This is a laminated chart students can use for quick reference in lab*)

Ingram, David; Vince-Prue, Daphne; Gregory, Peter (2002) Science & The Garden, Blackwell Publishing, (ISBN: 10: 0632053089)

Horst, R Kenneth. (2001) Westcott's Plant Disease Handbook, Van Nostrand Reinhold, NY, 6nd Edition (ISBN: 0-792-38663-9)

Ohio Florists Association. (2000) Tips on Managing Floriculture Crop Problems, Ohio Florists Association, OH

University of California. (1997) Soil Sterilization: A Nonpesticidal Method for Controlling Diseases, Nematodes, and Weeds, UC, #2137

University of California. (2000) The Safe and Effective Use of Pesticides, UC #3324 (ISBN: 1-879906-43-0)

Fischer, Bill (1998) Growers Weed Identification Handbook University Of California (ISBN: 0-931876-43-5)

University of California. (2000) Pests of Landscape Trees and Shrubs: An Integrated Pest Management Guide 2/E ANR publication, (ISBN: 1-879906-61-9)

Website – University of California, Statewide Integrated Pest Management Program – www.ipm.ucdavis.edu

Pesticide regulations and licensing information may be obtained from the California State Agricultural Commissioners Office.

Note: There are many references and computer programs designed to assist in the diagnosis and treatment of specific problems that occur with the cultivation of ornamental and agricultural plants. Examples of these specific to horticulture are: Sunset Garden Problem Solver (CD-Rom), and the Ortho Problem Solver, (Book and CD-Rom).

Statewide Articulation: CPP-directed elective, other universities as lower division elective

FDRG Lead Signature:	Date:
Mark E. Bender, PhD CSU Stanislaus	
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