

Discipline: Agriculture	Sub-discipline: Environmental Horticulture
General Course Title: Plant Propagation / Production	Min. Units: 3 Semester
Proposed Suffix: L	
<p>Course Description: Plant propagation and production practices with emphasis on nursery operations including sexual and asexual reproduction, planting, transplanting, fertilizing, plant pest and disease control; structures and site layout; preparation and use of propagating and planting mediums; use and maintenance of common tools and equipment; regulations pertaining to plant production. 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 effect of temperature, water, humidity, and fertility on plant growth • Describe the principles of plant reproduction, sexual and asexual • Demonstrate the ability to grow plants from propagation to salable size by showing a mastery of the following skills: including: <ol style="list-style-type: none"> 1. Demonstrating plant propagating methods including seed, cuttings, budding, grafting, layering, division, micro-propagation (tissue culture); 2. Determine the proper timing for the various propagation and production techniques appropriate to the plant specie and propagation method; 3. Formulating planting and propagating media as specified in a recipe; 4. Measuring and mixing fertilizers and applying them following label directions; 5. Planting and transplanting a variety of plants into appropriate containers. • Exhibit the personal skills (attitude, work habits, etc.) for successful employment in the wholesale nursery business • Discuss control procedures for at least ten common garden, landscape, and greenhouse pests. • Identify, use, and maintain common propagation, nursery and landscape tools and equipment • Plan and design a nursery layout given a set of parameters • Develop a poster of, and provide a demonstration of a selected propagation method. • Describe the various types of wholesale plant production industries locally and in California 	
<p>Course Content:</p> <ol style="list-style-type: none"> 1. Wholesale plant production operations 2. Introduction to plant environmental requirements <ol style="list-style-type: none"> a. light b. Temperature c. Water d. Air e. Anchorage f. Minerals g. Photoperiodism and its effect on plant growth <p>Plant Propagation/ Production (Content Continued)</p>	

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.

3. General aspects of plant propagation
 - a. Objectives in the study of plant propagation
 - b. Methods of propagating plants
 - c. Basic types of reproduction
4. Use and maintenance of common propagation and nursery tools and equipment
5. Sexual propagation
 - a. Principles of sexual propagation and hybridization
 - (1) Production of flowers
 - (2) Production of the embryo
 - (3) Apomixes
 - (4) Fruit and seed development
 - (5) The mature seed
 - b. The relationship of plant breeding to nursery practices
 - c. Seed germination requirements and practice
 - d. Seed collection and processing
 - e. Discussion of various seed treatment processes
 - (1) Scarification
 - (2) Stratification
 - (3) Heat treatment
 - f. Transplanting of seedlings
 - g. Plug production
6. Asexual propagation
 - a. Importance and reasons for using asexual propagation
 - b. The clone
 - c. The plant patent law
 - d. Different types of asexual propagation
7. Cuttings
 - a. Requirements of cutting propagation
 - (1) Moisture
 - (2) Temperature
 - (3) Media
 - (4) Hormones
 - (5) Disease prevention
 - (6) Mother stock
 - b. Types of cuttings
 - (1) Hardwood, semi-hardwood, softwood, and herbaceous cuttings
 - (2) Stem (tip, straight, heel, mallet, cane), leaf (segments, leaf bud, leaf vein, leaf petiole), root cuttings
 - c. Hardening off of cuttings
 - d. Potting and canning cuttings
 - e. Seasonal timing and programming of cutting production

**Plant Propagation/ Production
(Content Continued)**

8. Grafting and Budding
 - a. Theoretical aspects

<ul style="list-style-type: none"> (1) Reasons for Grafting and Budding (2) Formation of the graft union (3) Healing of the graft or bud (4) Polarity in grafting (5) Grafting incompatibility (rootstock selection, interstock) (6) Rootstock - scion relationships b. Techniques of Grafting <ul style="list-style-type: none"> (1) Methods (2) Tools and materials (3) Selection and storage of scion wood (4) Grafting classified according to placement (5) Aftercare of grafted trees c. Techniques of Budding <ul style="list-style-type: none"> (1) Methods (2) Seasonal timing (3) Wrapping buds d. Rootstock selection <ul style="list-style-type: none"> (1) Fruiting species (2) Ornamental species <p>9. Other common propagation methods</p> <ul style="list-style-type: none"> a. Layering b. Division <p>10. Micropropagation/tissue culture</p> <p>11. Cultural considerations of nursery stock production</p> <ul style="list-style-type: none"> a. Planting media formulation and usage b. Fertilizing and watering of plant stock c. Planting and transplanting nursery stock in a variety of containers d. Pruning, Pinching, Disbudding e. Chemical growth regulation f. Controlling insect and disease pests of nursery stock g. Preparation of nursery stock for sale h. Purchasing nursery stock for growing on or reselling i. Labeling/growing standards for retail sales and ads <p>12. Propagation structures</p> <ul style="list-style-type: none"> a. The greenhouse environment b. Cold frames and hot beds c. Shade structures and growing blocks <p>Laboratory Activities: Individual Laboratory Activities are designed to support course objectives.</p>	<p>Methods of Evaluation: Laboratory</p> <p>Comprehensive Quizzes and Exams</p> <p>Written Critical Thinking Scenarios</p> <p>Problem Analysis and Solution</p> <p>Research and Term Papers</p>
	<p>Methods of Evaluation: Laboratory</p> <p>Laboratory Skill Validation by Observation</p> <p>Laboratory Projects and Reports</p> <p>Laboratory Research Projects and Reports</p> <p>Laboratory Skill Practicum Exams</p>
<p>Typical Textbooks:</p> <p><u>Hartmann & Kester's Plant Propagation: Principles and Practices (8th Edition)</u> ,Hudson T. Hartmann , Dale E. Kester , Fred T. Davies, Robert Geneve (ISBN-13: 978-0135014493)2010</p> <p><u>Greenhouse Operation and Management (7E)</u>, Nelson Paul V, Prentice-Hall, NJ (ISBN 13: 978-0132439367) 2011</p>	

Reference:

The Commercial Greenhouse, Boodley, James W., Delmar Publishers (ISBN: 0-8273-7311-2)

The Complete Book of Plant Propagation, Clarke and Toogood, Sterling Publications, (ISBN: 1-84188-144-9), 2001

Floriculture: Principles and Species, Wilknis, Harold, Prentice-Hall, NJ, (ISBN: 0-13-046250-0) 2005

Website: ipm.ucdavis.edu, provides data on plant diseases and pests

Note: Many introductory horticulture texts have chapters/sections dealing with propagation and the production of plant materials. Texts listed under the Introduction to Environmental Horticulture course are examples of these references. In addition, there are a large number of other specific references dealing with the propagation of individual or related groups/genera of plants.

Statewide Articulation: Formally CAN AG 10, CPSLO-EHS 245, CPP-PLT 132/L, other universities as lower division elective

FDRG Lead Signature:

Date:

Mark E. Bender, PhD CSU Stanislaus

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Internal Tracking Number