

**HORT 70 Course Outline as of Spring 2012****CATALOG INFORMATION**

Dept and Nbr: HORT 70 Title: PLANT PROPAGATION

Full Title: Plant Propagation

Last Reviewed: 2/11/2019

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	3.00	Lecture Scheduled	2.00	17.5	Lecture Scheduled	35.00
Minimum	3.00	Lab Scheduled	3.00	6	Lab Scheduled	52.50
		Contact DHR	0		Contact DHR	0
		Contact Total	5.00		Contact Total	87.50
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 70.00

Total Student Learning Hours: 157.50

Title 5 Category: AA Degree Applicable

Grading: Grade Only

Repeatability: 00 - Two Repeats if Grade was D, F, NC, or NP

Also Listed As:

Formerly: AG 92.1

**Catalog Description:**

Introduction to commercial practices of plant propagation by seed (sexual) and vegetative (asexual) methods. Includes seed collection, storage, and treatment; sowing and germination requirements; cuttings, layering, grafting/budding techniques; propagation structures and materials; overview of micropropagation techniques; variety selection and plant patent laws. Students evaluate various propagation methods with a plant species of their choice.

**Prerequisites/Corequisites:****Recommended Preparation:**

Eligibility for ENGL 100 or ESL 100

**Limits on Enrollment:****Schedule of Classes Information:**

Description: Introduction to commercial practices of plant propagation by seed (sexual) and vegetative (asexual) methods. Includes seed collection, storage, and treatment; sowing and germination requirements; cuttings, layering, grafting/budding techniques; propagation structures and materials; overview of micropropagation techniques; variety selection and plant

patent laws. Students evaluate various propagation methods with a plant species of their choice.  
(Grade Only)

Prerequisites/Corequisites:

Recommended: Eligibility for ENGL 100 or ESL 100

Limits on Enrollment:

Transfer Credit: CSU;

Repeatability: Two Repeats if Grade was D, F, NC, or NP

## **ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:**

<b>AS Degree:</b>	<b>Area</b>	Effective:	Inactive:
<b>CSU GE:</b>	<b>Transfer Area</b>	Effective:	Inactive:

<b>IGETC:</b>	<b>Transfer Area</b>	Effective:	Inactive:
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<b>CSU Transfer:</b> Transferable	Effective:	Fall 1981	Inactive:
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<b>UC Transfer:</b>	Effective:	Inactive:
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### **CID:**

CID Descriptor: AG - EH 116L Plant Propagation / Production

SRJC Equivalent Course(s): HORT70

### **Certificate/Major Applicable:**

Both Certificate and Major Applicable

## **COURSE CONTENT**

### **Outcomes and Objectives:**

Upon completion of the course, students will be able to:

1. Describe and compare the requirements of various sexual and asexual propagation methods used in the horticulture industry.
2. Select common structures, containers, soil media and other supplies used in commercial plant propagation.
3. Evaluate and differentiate between sexual and asexual propagation methods for various plant species.
4. Demonstrate sowing techniques for a variety of plant species.
5. Determine how seed dormancy requirements are met for certain plant species propagated by seed.
6. Describe the physiological processes and environmental requirements of seed germination
7. Collect cuttings from stock plants and store them for successful cutting propagation.
8. Describe the physiological processes of wound-healing and root formation in vegetative propagation techniques.
9. Compare hormone treatments, wounding, and other methods of improving rooting success of cuttings.
10. Describe the benefits of bottom heat, leaf surface reduction, hormone dips, mist systems, and hardening off.
11. Select propagation equipment and structures appropriate for various plant varieties and commercial nursery enterprises.
12. Employ sanitation procedures in the use of propagation materials and equipment.
13. Evaluate propagation methods in terms of economic return for annuals, biennials and

perennials.

14. Analyze propagation methods based on desired outcomes in plant characteristics, uniformity, quality and quantity.

15. Justify the significance of the selection of high quality plant material in all plant propagation practices.

16. Implement plant labeling requirements associated with good propagation practices and plant patent laws.

17. Demonstrate safe and correct use and care of grafting and budding knives.

18. Demonstrate procedures for whip, tongue and cleft grafting.

19. Demonstrate procedures for T-budding.

20. Classify business enterprises within the nursery industry based on the propagation methods of plants sold.

21. Describe various nursery enterprises that specialize in different propagation methods to supply wholesale growers.

## **Topics and Scope:**

### **I. Propagation structures and materials**

#### **A. Propagation structures**

1. Cold frames

2. Hot beds

3. Greenhouses

4. Germinating chambers

#### **B. Media for propagating nursery plants**

#### **C. Sanitation techniques in propagation**

#### **D. Soil, water and supplementary fertilizers**

#### **E. Containers for propagating and growing young plants**

### **II. Principles and techniques of plant propagation by seed**

#### **A. Types of plants propagated by seed**

1. Annuals and herbaceous perennials

2. Shrubs

3. Trees

4. Hybrids

a. Annuals

b. Perennials

5. Fruit tree rootstocks

#### **B. Pollination and fertilization fundamentals**

#### **C. Seedling variation**

#### **D. Compatibility and pollination requirements of certain varieties**

#### **E. Monoecious and dioecious plant varieties**

#### **F. Pollination control techniques**

#### **G. Fruit and seed development**

#### **H. Apomictic seeds (e.g.: Citrus)**

#### **I. Seed anatomy**

#### **J. Seed collection, processing and storage**

#### **K. Seed germination**

1. Environmental factors

a. Light

b. Temperature

c. Moisture

d. Aeration

2. Seed treatments
  - a. Scarification and seedcoat softening
  - b. Stratification and dormancy requirements
  - c. Heat treatment
- L. Transplanting seedlings
- M. Hardening off
- III. Characteristics of plant propagation by vegetative methods
  - A. Clones and genetic uniformity
  - B. Maintaining identity of nursery and propagation stock
  - C. Botanical nomenclature related to propagation
  - D. Cultivars (cultivated varieties)
  - E. Varieties (botanical or naturally occurring varieties)
- IV. Principles and techniques of plant propagation by cuttings
  - A. Types of plants propagated by cuttings
    1. Perennials
    2. Shrubs and vines
    3. Trees
  - B. Types of cuttings
    1. Stem cuttings
      - a. Herbaceous
      - b. Softwood
      - c. Semi-hardwood
      - d. Hardwood
    2. Leaf and leaf-bud cuttings
    3. Root cuttings
  - C. Collection and storage of cuttings
  - D. Root-inducing treatments
    1. Hormones
      - a. Powders
      - b. Liquids
    2. Wounding
    3. Callus and callus development
  - E. Greenhouse control of cuttings
    1. Types of rooting media
    2. Bottom heat
    3. Overhead intermittent mist
- V. Principles and techniques of plant propagation by grafting and budding
  - A. Types of plants propagated by grafting and budding
    1. Roses
    2. Grapevines
    3. Fruit and nut trees
    4. Landscape tree cultivars
  - B. Theoretical aspects
    1. Reasons for grafting and budding
    2. Formation of the graft union
      - a. Cambium alignment in stock and scion
      - b. Vascular tissue development in the new graft union
    3. Healing of the union
    4. Polarity in grafting
    5. Compatibility

- a. Stock (rootstock)
- b. Interstock
- c. Scion
- d. Stock-scion relationships and effects of stock on scion development

#### C. Grafting techniques

1. Methods of grafting
  - a. Whip
  - b. Tongue
  - c. Cleft
  - d. Variations and special methods
2. Tools and materials
  - a. Use and care of grafting knives
  - b. Grafting wax and sealers
3. Selection and storage of scion wood
4. Seasonal timing
  - a. Condition of scion wood
  - b. Condition of stock
5. After-care of grafted plants

#### D. Budding techniques

1. Methods
  - a. T-budding
  - b. Other methods and variations
2. Tools and materials
  - a. Use and care of budding knives
  - b. Wrapping materials
3. Seasonal timing
  - a. Condition of bud wood
  - b. Condition of stock
4. After-care of budded plants

### VI. Principles and techniques of plant propagation by other means

#### A. Layering

#### B. Air layering

#### C. Division

1. Rhizomes
2. Tuberous roots

#### D. Separation

1. Bulbs, bulblets, aerial bubils
2. Corms and cormels
3. Tubers

#### E. Stolons and runners

### VII. Micropropagation and tissue culture

#### A. Overview of micropropagation in horticultural crops

1. Taking of explants
2. Culture in sterile media
3. Multiplication
4. Transplanting

#### B. Micropropagation facilities and techniques

#### C. Evaluation of micropropagation methods applied to various horticultural crops

#### D. Plants commonly propagated by micropropagation methods

### VIII. Evaluation of propagation methods

- A. Costs and benefits associated with asexual and sexual means
    - 1. Uniformity and predictability
    - 2. Equipment and skills required
    - 3. Time required to produce saleable plant product
  - B. Methods required to produce certain kinds of plants or crops and maintenance of desired growth form of parent stock
  - C. Quality of propagated plants
    - 1. Trueness to type
    - 2. Uniform health and vigor
- IX. Types of specialty propagation nurseries
- A. Plugs
  - B. Liners
  - C. Grapevines and fruit trees
  - D. Roses

**Assignment:**

- 1. Propagation experiments
- 2. 3-5 page research report
- 3. Weekly text reading assignments
- 4. Field trip participation
- 5. Lab and field trip reports
- 6. Two to four quizzes
- 7. Midterm and final exam

**Methods of Evaluation/Basis of Grade:**

**Writing:** Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

Lab and field trip reports, research report	Writing 10 - 20%
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**Problem Solving:** Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Propogation experiments, field work	Problem solving 20 - 30%
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**Skill Demonstrations:** All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

Propogation experiments, field work	Skill Demonstrations 10 - 20%
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**Exams:** All forms of formal testing, other than skill performance exams.

Quizzes, midterm, and final: multiple choice, completion, matching, true/false	Exams 40 - 50%
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**Other:** Includes any assessment tools that do not logically fit into the above categories.

Attendance and participation, including field trips and labs

Other Category  
10 - 20%

**Representative Textbooks and Materials:**

Hartmann H., and Kester, D. Plant Propagation, Principles and Practices, 8th ed., Prentice Hall, NJ. 2011

MacDonald, B. Practical Woody Plant Propagation for Nursery Growers, Timber Press. 1986 (Classic)

Nursery Stock Manual, Timber Press. Dirr, M., Heuser, Jr., C. 1995 (Classic)

The Reference Manual of Woody Plant Propagation, Viking Press. 2009

Instructor prepared materials