BUTTE COLLEGE
COURSE OUTLINE

I. **CATALOG DESCRIPTION**

EH 70 - Plant Propagation and Nursery Practices **3 Unit(s)**

Prerequisite(s): NONE
Recommended Prep: Reading Level IV; English Level IV; Math Level III
Transfer Status: CSU
34 hours Lecture
51 hours Lab

This course is an introduction to 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. (C-ID AG-EH 116L).

II. **OBJECTIVES**

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

A. Describe the principles of plant reproduction, sexual and asexual.
B. Demonstrate plant propagating methods including seed, cuttings, budding, grafting, layering, division, micro-propagation (tissue culture).
C. Determine the proper timing for the various propagation and production techniques appropriate to the plant specie and propagation method.
D. Formulate planting and propagating media as specified in a recipe.
E. Measure and mix fertilizers and applying them following label directions.
F. Plant and transplant a variety of plants into appropriate containers.
G. Exhibit the personal skills (attitude, work habits, etc.) for successful employment in the wholesale nursery business.
H. Discuss control procedures for at least ten common garden, landscape, and greenhouse pests.
I. Identify, use, and maintain common propagation, nursery and landscape tools and equipment.
J. Plan and design a nursery layout given a set of parameters.
K. Develop a poster of, and provide a demonstration of a selected propagation method.
L. Describe the various types of wholesale plant production industries locally and in California.

III. **COURSE CONTENT**

A. **Unit Titles/Suggested Time Schedule**

Lecture

Topics	Hours
1. Wholesale plant production operations	2.00
2. Introduction to plant environmental requirements	2.00
a. Light	
b. Temperature	
c. Water	
d. Air	
e. Anchorage	
f. Mineral Nutrition	
g. Photoperiodism and its effect on plant growth	

3. General aspects of plant propagation 3.00
   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 2.00
5. Sexual propagation 4.00
   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 3.00
   a. Importance and reasons for using asexual propagation
   b. The clone
   c. The plant patent law
   d. Different types of asexual propagation
7. Cuttings 4.00
   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
8. Grafting and Budding 3.00
   a. Theoretical aspects
      (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

(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
(1) Methods
(2) Seasonal timing
(3) Wrapping buds

d. Rootstock selection
(1) Fruiting species
(2) Ornamental species

9. Other common propagation methods a. Layering b. Division	2.00
10. Micropropagation/tissue culture	2.00
11. Cultural considerations of nursery stock production 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	4.00
12. Propagation structures a. The greenhouse environment b. Cold frames and hot beds c. Shade structures and growing blocks	3.00
Total Hours	34.00

Lab

Topics	Hours
1. Seed Propagation of Annual Plants	3.00
2. Transplanting Plugs	3.00
3. Budding- Utilizing T-Budding and Chip Budding Techniques	3.00
4. Soil Mixes for Propagation, and Sanitation of Equipment, Containers and Facilities	4.00
5. Propagation by Division	4.00
6. Propagation by Separation	4.00
7. Making Herbaceous Cuttings	3.00
8. Propagation of Evergreen Species by Using Softwood and Semi-Hardwood Cuttings	4.00
9. Seed Scarification and Stratification	3.00
10. Techniques of grafting and budding	3.00
11. Layering- Ground and Air Layering	3.00
12. Propagation of Deciduous Species by Using Hardwood Cuttings	4.00

13. Propagation of Ornamental Trees by Seed	4.00
14. Crop scheduling	3.00
15. Fertilizers	3.00
Total Hours	51.00

IV. METHODS OF INSTRUCTION

A. Lecture
B. Class Activities
C. Homework: Students are required to complete two hours of outside-of-class homework for each hour of lecture
D. Laboratory Experiments
E. Nursery evaluation visits, hands on laboratory work, oral reports and field trips.

V. METHODS OF EVALUATION

A. Exams/Tests
B. Quizzes
C. Homework
D. Lab Projects
E. Written Assignments

VI. EXAMPLES OF ASSIGNMENTS

A. Reading Assignments
    1. Read the textbook chapter on seed propagation and prepare for an in class discussion on proper seed scarification methods.
    2. Read a journal article from American Society of Horticultural Science about sexual or asexual propagation. Discuss your article's findings in small groups in class.
B. Writing Assignments
    1. Keep a weekly lab journal of two different nursery crops (shrub, vine, groundcover or tree). Include weekly cultural management practices and quantitative crop data (e.g., quantity, height, number of flowers, length, etc.)
    2. Write a 3-5 page research paper on plant hormones and wound-induced roots. Cite your sources and write the paper in the format of American Society of Horticultural Science.
C. Out-of-Class Assignments
    1. Develop a database for organizing and scheduling cutting and seeding data. Include at least 10 different categories with 10 example crops listed for each.
    2. Create a design and bill of materials for a mist propagation system that includes a controller, mist nozzles, pipe, electrical components, and supplies.

VII. RECOMMENDED MATERIALS OF INSTRUCTION

Textbooks:

A. Hartmann and Kester. Plant Propagation Principles and Practices. 8th Edition. Prentice Hall, 2010.

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