

College of Micronesia-FSM

PO Box 159
Pohnpei, FM 96941

AGRICULTURE (AG) 086 Micropropagation and Nursery Practices

Course Description (Catalog)

Introduces the basic principles and skills regarding techniques, practices and procedures of plant tissue culture (micropropagation), asepsis, laboratory plan, equipment and facilities, and greenhouse growing.

Course Prepared by:

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	Hours / Week	#. Of Weeks	Total Hours	Semester Credits
Lecture	3	16	48	3
Laboratory	3	16	48	1
Workshop				
Total Semester Credits				4

Purpose of Course:

Degree Requirement: _____

Degree Elective: _____

Certificate: _____ X _____

Remedial: _____

Other: _____

Prerequisite of Courses:

None

Signature, Chair Curriculum Committee

Date Approved by Committee

Signature, President, COM-FSM

Date Approved by President

AG 086 Micropropagation and Nursery Practices

I COURSE OBJECTIVES

Program Learning Outcomes:

Upon successful completion of the Certificate of Achievement in Agriculture & Food Technology, students will be able to:

1. Demonstrate an overall knowledge of the crop production process.
2. Practice good agricultural management and marketing skills.
3. Identify and demonstrate the fundamentals of food processing, preparation techniques, the relationship between scientific principles and cooking procedures.
4. Identify and demonstrate basic skills and principles of swine and poultry production techniques including breed selection, feed, housing, management techniques and animal health.
5. Apply the basic skills and knowledge of nursery micropropagation practices, transplanting, harvesting and maintenance.
6. Identify the proper use of land for agriculture purposes, local ornamental and turf management.

Student Learning Outcomes

Upon successful completion of the course, students should be able to:

1. Define and explain the concept of micropropagation and its importance in agriculture
 - 1.1. Define micropropagation.
 - 1.2. Explain the biological and commercial importance of micropropagation.
2. Describe plant growth processes in the tissue culture environment.
 - 2.1. Describe how photosynthesis, transpiration and respiration are relevant to plant tissue culture.
 - 2.2. Describe the stages of plant growth during micropropagation of a selected plant.
3. Explain the importance of growing media for use in tissue culture.
 - 3.1. Explain the roles of the major and minor nutrients in tissue culture.
 - 3.2. Explain the functions of the different components: nutrients, carbohydrates, vitamins and plant growth regulators.
4. Describe and demonstrate basic micropropagation and nursery techniques.
 - 4.1. Describe the basic steps in producing a plant by micropropagation.
 - 4.2. Describe a method of sterilization in micropropagation.
 - 4.3. Demonstrate how to prepare plant tissue for micropropagation.
 - 4.4. Demonstrate how to prepare growing media for micropropagation.
 - 4.5. Describe how to move a micropropagated plant to open culture.
 - 4.6. Design a simple greenhouse and nursery for micropropagated plants.

II COURSE CONTENT

Lecture:

1. Introduction and Terminology of Plant Tissue Culture
2. Plant Nutrients and their Importance in Plant Tissue Culture
3. The Tissue Culture Laboratory
4. Micropropagation Techniques
5. Plant growth regulators
6. Tissue culture of specific species
7. The tissue culture environment
8. Hardening of tissue-cultured plants
9. Commercial applications

Laboratory:

Part I General Laboratory Techniques

- a. Laboratory Safety
- b. Maintenance of Aseptic Conditions
- c. Laboratory Equipment Handling
- d. Selection, Cleaning and Preparation of Glassware
- e. Sterilization procedures

Part II Media Formulation

- a. Media components and preparation
- b. Stock solutions
- c. Plant growth regulators
- d. Calculations
- e. pH adjustment
- f. Autoclaving
- g. Filter sterilization
- h. Storage of Media

Part III Micropropagation

- a. Selection of ex-plants
- b. Collection, storage and transport
- c. Surface sterilization methods
- d. Initiation of cultures
- e. Establishment of cultures
- f. Multiplication/Proliferation of cultures
- g. Rooting *in vitro*

Part IV Nursery Techniques

- a. Rooting *ex-vitro*
- b. Hardening and transfer to soil

III TEXTBOOK

Kyte, L. and J. Kleyn. *Plants from Test Tubes: An Introduction to Plant Tissue Culture*. 3rd Edition (or latest edition). Portland, OR: Timber Press, 1996. ISBN: 9870881923612.

IV REFERENCE MATERIALS

Hudson, H.T., D.E. Kester, F.T. Davies, Jr. and R.L. Graves. *Hartmann and Kester's Plant Propagation: Principles and Practices*. 7th Edition (or latest edition). Upper Saddle River, NJ: Pearson Education, 2002. ISBN: 0136792359 (available in the COM-FSM Library)

Trigiano, R.N. and D.J. Gray. *Plant Tissue Culture Concepts and Laboratory Exercises*. 2nd Edition (or latest edition). Boca Raton, FL: CRC Press, 2000. ISBN: 084942029

V REQUIRED COURSE MATERIALS

Laboratory Notebook

Calculator

1 small bottle rubbing alcohol or antibacterial hand sanitizer

VI INSTRUCTIONAL MATERIALS/EQUIPMENT AND COST FOR THE COLLEGE

Equipment (One-time Expense)		\$3,900
• Inoculation Box	500	
• Sterilizer	650	
• Refrigerator	550	
• Growth Shelves	600	
• Balances	1500	
Supplies (Long Term)		\$2,600
• Alcohol lamp		
• 100 pcs culture bottles		
• Pipet		
• Forceps		
• Scalpel and blades		
• pH paper		
Supplies (Semester)		\$ 260
• Growing media	200	
• Bleach	10	
• Denatured Alcohol	25	
• Distilled Water	15	
• Paper towels	10	
Total		\$6,760

VII METHODS OF INSTRUCTION

Lectures and discussions

Laboratory project

VIII EVALUATION

Suggested final course grade: 60% lecture grade + 40% Lab grade

100 – 90 = A

89 – 80 = B

79 – 70 = C

69 – 60 = D

59 – Below = F

IX CREDIT-BY-EXAMINATION

None

X ATTENDANCE POLICY

College of Micronesia-FSM Attendance Policy will be applied.

XI ACADEMIC HONESTY POLICY

College of Micronesia-FSM Academic Honesty Policy will be applied.