**Agriculture Education: Greenhouse Management**

**COURSE SYLLABUS**

**COURSE TITLE:**  Greenhouse Management/Ornamental Horticulture Dual

**INSTRUCTOR:** Mr. Danny Wilson

Cumberland County High School

660 Stanley Street

Crossville, TN 38555

(931)484-9541

**COURSE DESCRIPTION:**

Greenhouse Management is an applied-knowledge course designed to prepare students to manage greenhouse operations. This course covers principles of greenhouse structures, plant health and growth, growing media, greenhouse crop selection and propagation, and management techniques. It provides students with the technical knowledge and skills needed to prepare for further education and careers in horticulture production. Greenhouse Management is a dual credit course with statewide articulation. Standards in this course are aligned with Tennessee Common Core State Standards for English Language Arts & Literacy in Technical Subjects, Tennessee Common Core State Standards in Mathematics, and Tennessee state standards for Biology I and Biology II, as well as National Agriculture, Food and Natural Resources Career Cluster Content Standards.

**Textbook:** Reiley, H. Edward Introductory Horticulture, Seventh Edition . ISBN: 1-4018-8952-4

**GRADING AND EVALUATION PROCEDURES:**

**Assignments Possible Points**

Quizzes 100 points each

Daily Assignments 100 points each

Tests/Exams 100 points each

Lab/Shop 100 points each

Notebooks 100 points each

**Value or Percentage of Grade**

Quizzes and Tests 40%

Daily/Lab Assignments 40%

Final Exam 20%

**GRADE DETERMINATION**

93%-100% = A

85%-92% = B

75%-84% = C

70%-74% = D

Below 70% = F

**COURSE REQUIREMENTS**

This course is designed to introduce students to Agricultural Education and Greenhouse Management. Students are asked to do his/her own work and follow all instruction in the class/shop/greenhouse for their own safety. Each student will be provided a folder that will remain in my room for daily writing assignments to be checked by me for a notebook grade at the end of each week. This folder will also house any work and tests and the student is responsible for keeping their notebook up to date at all times. Students are also expected to come to class with paper and pencil, or other materials that are necessary as deemed by me.

Each student must **TAKE** and **PASS** a Safety Exam with **100%** before they will be allowed to enter the shop/lab/greenhouse. Students will be introduced to and using tools and equipment in the shop/lab/greenhouse and safety is of the utmost importance. **This policy will be enforced at all times, no questions asked.**

**DISCIPLINE PLAN**

**Expectations**

1. Be respectful of everyone in the class at all times.
2. Bring all materials to class and be prepared to work when the bell rings.
3. Please raise your hand when you have a question or when you need to leave the room.
4. You may not leave the room unless you have a hall pass signed by me and you have also signed out on the sign-out log sheet.
5. No cell phones or other electronic devices allowed in class. These devices will be taken up and turned in to administration.
6. Stay in your seat until the bell rings.
7. No horseplay in the classroom, shop, or greenhouse at any time!
8. No student will be allowed in the shop unless instructed by me. Safety glasses will be worn at all times in the shop when working with the equipment.
9. Follow all other classroom, shop, and school board rules at all times.

**Consequences**

1. Verbal Warning
2. Phone call and/or meeting with parent or guardians
3. Report to Administration. Discipline form will be written.

**Additional Information**

Students enrolled in an agriculture class have the option of joining the National FFA Organization. The dues for the organization are $15, which includes membership and a t-shirt. It is strongly encouraged that students join, where they will participate in an abundance of activities during and after school. FFA builds the foundation of personal growth, career leadership, and premier growth for all of its members. For more information on FFA, you may visit http://www.ffa.org

Below is a copy of the state standards and competencies for this course. Students/Parents are asked to review the competencies because these are the requirements that the students will be expected to learn and understand by the end of the course. If you have read and understand these standards and this syllabus, please sign below.

Course Standards

Greenhouse Industry Introduction

1. Analyze the global nature of the horticulture industry and assess the economic impact and technological advancements associated with greenhouse production practices. Create a timeline to summarize the history and development of the greenhouse production industry, citing specific textual evidence. (TN CCSS Reading 1, 2; TN CCSS Writing 4)
2. Accurately maintain an activity recordkeeping system and apply proper financial recordkeeping skills as they relate to a greenhouse industry. Demonstrate the ability to analyze records by generating reports and completing related applications (i.e., employment application, efficiency reports, SAE applications, and profit and lost statements). (TN CCSS Reading 9; TN CCSS Writing 2, 9)
3. Apply the concepts of occupational safety and industry safety prevention and control standards by interpreting information from industry manuals.
   1. Assess the purpose of worker protection standards and obtain the worker protection standards student industry certification.
   2. Review common laboratory safety procedures for tool and equipment operation in horticulture laboratories, including but not limited to accident prevention and control procedures. Demonstrate the ability to follow safety and operational procedures in a lab setting and complete a safety test with 100 percent accuracy.

(TN CCSS Reading 3)

Greenhouse Design, Construction, and Components

1. Describe characteristics of successful greenhouses and create a list of factors for planning and designing greenhouse facilities. Factors must include physical location, market potential, utilities, climatic conditions, and production goals. (TN CCSS Writing 4)
2. Classify greenhouse structures by comparing and contrasting greenhouse construction materials, including but not limited to frames, coverings, and glazing materials. Justify selection of greenhouse construction materials based on cost effectiveness, stability, maintenance, and function. (TN CCSS Reading 8, 9; TN CCSS Writing 9)

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1. Create an annotated model representing research-based practices in greenhouse planning and design and justify the process outlined in the model. The design must include at least the following items: structure materials, layout, lighting, bench arrangements, traffic flow, and physical location. (TN CCSS Reading 7; TN CCSS Writing 4, 8)
2. Compare general maintenance and upkeep requirements for a variety of greenhouses in relation to the type of structure and associated systems. Create a checklist of prescribed maintenance, preventative maintenance, monitoring, and troubleshooting schedules for greenhouse facilities and equipment. Demonstrate the mechanical skills needed for the general maintenance and repair of greenhouses and associated systems (such as basic wiring, plumbing, and general construction). (TN CCSS Reading 2, 3; TN CCSS Writing 4, 8)

Growing Media

1. Compare and contrast the attributes of growing mediums. Write an informative essay to describe the major components of soil, and identify basic physical and chemical characteristics of soil including structure and texture. (TN CCSS Reading 9; TN CCSS Writing 2)
2. Identify and provide written justification to describe the effects of soil and soilless composition (pH, organic matter content, and mineral content) on plant health and growth. Perform basic soil sampling and testing techniques and interpret test data to formulate corrective actions as needed. (TN CCSS Reading 1, 3; TN CCSS Writing 7, 9; TN CCSS Math S-ID)
3. Explain the principles of media preparation; develop a check sheet to guide media preparation. Describe the purpose, methods, and importance for sterilizing media. Compare and contrast the cost effectiveness of premix and personal mix media to soil media. (TN CCSS Reading 7; TN CCSS Writing 8)

Plant Structure, Function, and Growth

1. Apply concepts of scientific taxonomy and industry-specific terminology in distinguishing different species and types of plants. Create a visual chart, brochure, or fact sheet that identifies common plant species used in greenhouse production by classification, care, and use. (TN CCSS Reading 4)
2. Research the basic plant structure components and create an illustrative plant model to identify and differentiate among components. Demonstrate a working knowledge of plant physiology, including:

a. The relationship between form and function for major plant structures

b. The anatomical and physiological differences of specific plant species (TN Biology II 7)

1. Select relevant technical information to analyze and support claims regarding the relationships between light, temperature, and water on plant growth. Draw conclusions about the interrelationships between plant life processes (such as photosynthesis, respiration, and transpiration), plant growth, and maintenance. (TN CCSS Reading 8; TN Biology I 2; TN Biology II 7)

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14) Compare and contrast current industry approved methods to regulate plant growth including, but not limited to, environmental, physical, genetic and chemical. Demonstrate in a live setting or in a presentation the ability to apply the best growth regulator to specific plants to obtain selected outcomes. (TN CCSS Reading 3, 8, 9; TN Biology II 7)

Plant Nutrition

1. 15)  Analyze the nutrient requirements of plants and assess the importance of the 17 essential plant nutrients for plant health. Identify the chemical and biological processes needed to make nutrients available for growth and maintenance, and distinguish among nutrient deficiency and toxicity signs and symptoms in plants. (TN Biology II 7)
2. 16)  Research case studies to cite specific textual evidence determining the significance of safety hazards associated with fertilizer use. In an informative essay, justify the use of different precautions for the prevention or management of hazards and evaluate the efficacy of prevention measures. (TN CCSS Reading 1, 8, 9; TN CCSS Writing 2, 4, 7, 9)
3. 17)  Identify the basic types of fertilizers and their applications for greenhouse production crops. Differentiate the effects of fertilizer ratios on plant growth and health to hypothesize possible outcomes of each ratio. Calculate proper formulations of fertilizers based upon label directions using systems of equations. Demonstrate in a live setting or in a presentation the ability to follow fertilizer label procedures precisely as they pertain to selection, handling, application, storage, and disposal. (TN CCSS Reading 3; TN CCSS Math N-Q, A-CED)

Plant Propagation

18) Differentiate between the methods of sexual and asexual plant propagation by summarizing valid research. Compare and contrast the different techniques of propagation, explaining advantages and disadvantages of each in an informative text. Conduct at least the following: cutting, budding, layering, sowing, germination rate calculation, and seed viability. (TN CCSS Reading 2, 8; TN CCSS Writing 4, 9)

Environmental Control Systems

1. Assess the procedures required for producing multiple commercial plant species in a controlled environment, and apply these procedures to produce a variety of specific greenhouse crops. Evaluate environmental factors that affect greenhouse crops to justify management methods. (TN CCSS Reading 2; TN CCSS Writing 4)
2. Evaluate the greenhouse climate and recommend the proper climate control equipment to maintain an optimum growing climate, including but not limited to ventilation, humidifiers, heating, cooling, and shading. Provide written justification for each recommendation. (TN CCSS Writing 1, 4).
3. Demonstrate effective methods to meet water requirements for healthy plant growth. Examine and explain how water pH influences plant growth. Research from multiple technical texts the function and operating principles of greenhouse irrigation systems (such as misting, drip, and

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overhead systems) to meet watering requirements for the purposes of maintaining optimum moisture level for a variety of plants. (TN CCSS Reading 3; TN CCSS Writing 8; TN Biology II 7)

Diseases, Disorders, and Pests

1. Determine the economic and aesthetic impact of plant diseases, disorders, and pests. Identify and diagnose the symptoms of common plant diseases, disorders, and pests, and summarize methods of prevention, treatment, and control by drawing evidence from informational texts and relevant scientific literature. (TN CCSS Writing 2, 9; TN Biology II 7)
2. Identify the types of pesticides and their applications for greenhouse production. Research the safety hazards associated with pesticide use for multiple greenhouse pesticides. Calculate proper formulations of pesticides based upon label directions for specific pests by creating systems of equations that describe numerical relationships. (TN CCSS Reading 1; TN CCSS Writing 1, 4, 7, 9; TN CCSS Math N-Q, A-CED)
3. Demonstrate in a live setting or in a presentation the ability to follow pesticide procedures precisely according to label and safety guidelines, including selection, handling, personal protective equipment (PPE), application, storage, and disposal. (TN CCSS Reading 3)
4. 2Evaluate the basic principles and assess the overall effectiveness of integrated pest management (IPM) for controlling greenhouse pests and diseases. Compare with traditional chemical controls.

Hydroponic Applications

1. Examine the roles of hydroponic systems in greenhouse crop production. Describe essential elements of hydroponic systems; explore recent trends and advancements to design a hydroponic system for a specific greenhouse crop. (TN CCSS Reading 7; TN CCSS Writing 8)
2. Apply basic principles of hydroponics to compare hydroponic and soil-based growing methods for providing nutrients to plants. Summarize the advantages and disadvantages of using soilless media systems to evaluate the efficacy for specific crops. (TN CCSS Reading 7; TN CCSS Writing 8)

Greenhouse Business Management

1. Debate laws and regulations affecting horticulture businesses. Demonstrate the use of general business and recordkeeping skills necessary to manage a horticultural business, including but not limited to marketing, advertising, product displays, scheduling, inventory control, merchandise handling and profit and loss statements. (TN CCSS Reading 1, 9; TN CCSS Writing 2, 9)
2. Research, develop, and implement greenhouse production schedules for a representative sampling of greenhouse crops that includes at least the following: plant selection, plant material cost (seed, plug, cuttings), growth media, fertilizers, water, testing kits, pricing guides, profit margin, labor, and other expenses. (TN CCSS Reading 3; TN CCSS Writing 4; TN CCSS Math S-ID, Modeling)

**Student Signature:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Parent Signature:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**