POINTFUL EDUCATION

Agriscience I

Syllabus

» Course Overview

This course will prepare students for careers in agriscience. Agriculture is the world's largest industry, so the critical nature of understanding how agriculture must thrive in unpredictable conditions cannot be overstated. Throughout the modules, students will gain an understanding of some of the fundamental issues in agriscience, including safety, environmental factors such as climate change and extreme weather conditions, plant and animal science, and food safety. Additionally, students will explore how they can emerge as leaders in such a complex and exciting industry!

» Course Outline by Module

Module 1	Introduction to Agriculture in the Global Economy	**Module 5**	Scientific Skills in Animal Science
Module 2	Safety, Scientific, and Technological Principles of Agriscience Issues	**Module 6**	Agriscience Tools, Equipment, and Instruments
Module 3	Environmental Principles in the Agricultural Industry	**Module 7**	Leadership and Citizenship Skills
Module 4	Scientific Skills in Plant Science	**Module 8**	Food Safety and Handling Procedures

» Module Overview and Learning Objectives

Module 1. Introduction to Agriculture in the Global Economy

Agriculture is the world's largest industry, creating approximately $1.3 trillion of food annually and employing over one billion people. Around 50% of the livable land on Earth comprises pasture and cropland, which serve as both habitat and food for various species.

When agricultural operations are managed sustainably, they may protect watersheds, restore essential habitats, and enhance the health of the soil and the water supply.

However, unsustainable behaviors have adverse effects on both the environment and people.

This module will explore emerging agricultural trends in the global market. Additionally, you will discover economic impacts and issues impacting AFNR systems.

***Learning Objectives*:** In this module, students will:

- Evaluate and explain emerging trends and the opportunities they may create within the AFNR systems
- Assess the economic impact of an AFNR system on a local, state, national and global level
- Examine historical and current data to identify issues impacting AFNR systems
- Examine the role of the agricultural industry in the interaction of population, food, energy, and the environment
- Identify careers in Agriculture in the global economy

Module 2. Safety, Scientific, and Technological Principles of Agriscience Issues

In this module, you will learn about specific precautions to take when working in AFNR careers. In addition to learning about safety, you will discover the ways in which you can prevent accidents in the workplace by taking specific measures outlines by multiple organizations established for worker safety. This module will also identify ways in which you can help someone who does get injured on the job! You will identify plant and animal cells as well as how cells divide. Finally, you'll review the steps of the Scientific Method and how they pertain to AFNR

***Learning Objectives*:** In this module, students will:

- Identify the common causes and prevention of accidents in agriscience operations
    - Extract and utilize pertinent information from a container label and/or Safety Data Sheet (SDS) following Environmental Protection Agency (EPA), Worker Protection Standard, and Occupational Safety and Health Agency (OSHA) regulations
    - Identify proper disposal of hazardous waste materials and biohazards

    - Describe emergency procedures for basic first aid, CPR, chemical spills, fire extinguisher use
- Employ scientific measurement skills.
- Demonstrate safe and effective use of common laboratory equipment
- Identify the parts and functions of plant and animal cells
- Describe the phases of cell reproduction
- Implement the scientific method and science process skills through the design and completion of an agriscience research project
- Interpret, analyze, and report data
- Investigate DNA and genetics applications in agriscience including the theory of probability
- Evaluate advances in biotechnology that impact agriculture (e.g. transgenic crops, biological controls, etc.)

Module 3. Environmental Principles in the Agricultural Industry

There are innumerable factors that affect agriculture. Among the most major of these factors are environmental ones such as climate change and natural resources. Those employed in AFNR professions must all be scientists in terms of how they observe changing needs of the soil, how irrigation methods impact overall crop yield, and how air quality can impact, well, everything! Fortunately, there is an abundance of resources for agricultural professionals, from regulatory agencies who help experts understand laws and polies, to the Forest Service and the USDA that offer one-on-one help and a wealth of information on anything that may impact a thriving agricultural ecosystem. This module will explore all of these elements.

***Learning Objectives*:** In this module, students will:

- Research how different climactic and geological activity influences agriculture
- Describe various ecosystems as they relate to the agriculture industry
- Describe the environmental resources (soil, water, air) necessary for agriculture production
- Identify regulatory agencies that impact agricultural practices
- Apply Best Management Practices that enhance the natural environment
- Identify conservation practices related to natural resources

Module 4. Scientific Skills in Plant Science

Plant science is a major factor in agriculture. Understanding how plants grow, what types of nutrients they need to thrive, and how to protect them from pests and insects is fundamental for AFNR. There are a variety of careers that examine plant science and how to improve crop yields. Plants are unique in how they reproduce, grow, and perform functions like transpiration and respiration. Throughout the module, you will begin to understand the intricacies of how plants function and flourish.

***Learning Objectives*:** In this module, students will:

- Identify and describe the specializations within the plant science industry
- Categorize plants based on specific characteristics according to industry and scientific standards
- Examine the processes of plant growth including photosynthesis, respiration, transpiration, absorption, transfer, storage, reproduction, etc.
- Identify the nutrients required for plant growth from the periodic table and explain their functions
- Analyze information from a fertilizer label
- Propagate and grow plants through sexual and/or asexual reproduction
- Investigate the impacts of various pests and propose solutions for their control
- Investigate the nature and properties of food, fiber, and by-products from plants
- Explore career opportunities in plant science

Module 5. Scientific Skills in Animal Science

Animal science, like plant science, is a fundamental part of agriculture and AFNR. Some of the same economic factors affect and are affected by animals used for agricultural purposes. They serve a critical need to provide food and by-products consumed globally. In addition to the factors that influence plant science, there are additional considerations regarding animals. For instance, animal welfare is a primary concern. Animals must be treated humanely and per laws and regulations. Just like plant science,

there is an abundance of career opportunities in animal science. You can work alongside animals to keep them healthy or even as a research scientist working on ways to treat animals more humanely. The opportunities are plentiful.

***Learning Objectives*:** In this module, students will:

- Explain the economic importance of animals and the products obtained from animals
- Analyze commercially important livestock breeds in Florida
- Illustrate correct terminologies for animal species and conditions (e.g. age, sex, etc.) within those species
- Compare and contrast animal welfare issues
- Investigate the nature and properties of food, fiber, and by-products from animals
- Explore career opportunities in animal science

Module 6. Agriscience Tools, Equipment, and Instruments

Any agricultural operation, such as a farm, requires a complex management system. From knowing how to properly use and maintain tools and equipment to operating and servicing heavy machinery, there are a lot of moving parts - literally and figuratively. In this module, you will learn about the tools you will use or manage. You will gain an understanding of all the intricacies of managing an agricultural operation of any size. In addition to these skills, you will learn about some of the soft skills that are useful regardless of your AFNR career. For instance, you will understand recordkeeping, and communications - whether face-to-face or electronically. We will discuss the parts of a résumé and cover letter. A significant component of good communication is listening, so you will better understand why it is important and how to be a better listener.

***Learning Objectives*:** In this module, students will:

- Select and demonstrate proper use of hand tools in agriculture
- Operate service and maintain agriscience equipment, and instruments
- Analyze factors of owning a small farm or agribusiness
- Examine how communication plays a critical role in leading a small farm or agribusiness
- Utilize a record-keeping system to collect, interpret, and analyze data
- Enhance oral communications through telephone, interview, and presentation skills
- Enhance written communication by developing resumes and business letters
- Demonstrate interpersonal (nonverbal) communication skills
- Demonstrate good listening skills

Module 7. Leadership and Citizenship Skills

What do you think it means to be a leader? When you are inspired or motivated by someone, think of the types of characteristics they have. Leadership skills may seem natural - some people may be born with the ability to lead. But leadership skills can be learned and developed as well! This module will explore what it means to be an effective leader and how to successfully lead a team. In addition, you will discover what it means to be an active citizen and get involved in community-based activities that benefit others. Other themes explored in this module will include working cooperatively and collaboratively, identifying leadership opportunities, and developing a career development plan using SMART goals.

***Learning Objectives*:** In this module, students will:

- Identify and describe leadership characteristics
- Identify opportunities to apply acquired leadership skills
- Identify and demonstrate ways to be an active citizen
- Participate in community-based learning activities
- Demonstrate the ability to work cooperatively

- Conduct formal and informal meetings using correct parliamentary procedure skills
- Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations
- Develop both a leadership and a career development plan utilizing SMART goals that include 5-, 10-, and 20-year benchmarks

Module 8. Food Safety and Handling Procedures

Handling food properly and safely is a complex task. If proper safety precautions are not employed during each and every stage of food handling, the consequences could be dire. That may sound like an exaggeration, but it is not. Contamination of food due to mishandling can cause disease and even death. Throughout the module, you will explore the need for food safety and the measures taken to ensure it. Additionally, you will learn about the environmental concerns that food processing, such as GMOs, microorganisms, and irradiation, can have. Finally, you will explore careers in food safety!

***Learning Objectives*:** In this module, students will:

- Demonstrate proper safety precautions and use of personal protective equipment
- Evaluate the food safety responsibilities that occur along the food supply chain
- Explain techniques and procedures for the safe handling of food products
- Discuss the issues of safety and environmental concerns about foods and food processing (e.g., Genetically Modified Organisms, microorganisms, contamination, and irradiation)
- Determine appropriate industry response to consumer concerns to assure a safe and wholesome food supply
- Explore career opportunities in food safety in agriculture