

# Agricultural and Environmental Systems

## Career Field Pathways and Course Structure

### Courses in Food Science & Technology (A4)

PATHWAY COURSES	SUBJECT CODE
Agriculture, Food and Natural Resources <sup>1</sup>	010105
Science & Technology of Food <sup>2</sup>	011010
Applications of Food Science and Technology	011030
Food Marketing and Research	011015
Meat Science & Technology	011020
Microbial Food Science and Safety	011025
ELECTIVES	SUBJECT CODE
Animal and Plant Biotechnology <sup>2</sup>	012010
Business Management for Agricultural and Environmental Systems	010115
Agricultural and Environmental Systems Capstone <sup>3</sup>	010190
Communications and Leadership	010110

<sup>1</sup>First course in the Career Field; <sup>2</sup>First course in the Pathway; <sup>3</sup>Does not count as one of the required four courses

#### Agriculture, Food and Natural Resources

Subject Code: 010105

This is the first course in the Agricultural and Environmental Systems career field. It introduces students to the pathways that are offered in the Agricultural and Environmental Systems career field. As such, learners will obtain fundamental knowledge and skills in food science, natural resource management, animal science & management, plant & horticultural science, power technology and biotechnology. Students will be introduced to the FFA organization and begin development of their leadership ability.

#### Science and Technology of Food

Subject Code: 011010

This first course in the pathway examines the research, marketing, processing and packaging techniques applied to the development of food products. Learners will examine principles of food preservation techniques and determine correlations to food sensory, shelf life and food stability. Learners will examine and develop food safety, sanitation, and quality assurance protocol. Government regulations and food legislation will be examined and the implications to food science and technology will be identified.

#### Applications of Food Science and Technology

Subject Code: 011030

Learners will use principles and practices of food processing and packaging to develop solutions for problems in food production, handling and storage. Learners will examine heat preservation, cold processing, food irradiation, fermentation, milling, and hydrogenation processing techniques. Learners will examine the process of food product development and techniques used to measure food sensory aspects, shelf life and food stability. Learners will examine government regulation impact on labeling, new packaging technologies, harvesting, transportation, and the environment.

### **Food Marketing and Research**

Subject Code: 011015

Learners will focus on the stages of research process from research planning to gathering, analysis, and interpretation of data as it relates to food marketing management. Learners will apply knowledge of food additives, nutrition, mixes and solutions to enhance existing food products and to create new processed foods. Learners will identify and describe the impact that technological advances have on food production and availability. Cultural trends and preferences affecting product development will be examined.

### **Meat Science and Technology**

Subject Code: 011020

Learners will apply food chemistry and microbiology to processing, preservation, packaging, storage and marketing of meat products. Learners will design and implement a quality assurance program that meets legal compliance. Learners will evaluate carcass composition, assign quality grades, and examine value-added products. Learners will demonstrate knowledge of safety regulations and operate and maintain equipment and facilities. Learners will practice customer service and sales techniques while understanding the scope and importance of business regulations.

### **Microbial Food Science and Safety**

Subject Code: 011025

Learners are introduced to the chemistry, bioengineering and microbiology involved in producing food products. Processes contributing to the appearance, taste, texture, and smell of food products will be explored. Learners will examine functional foods, value-added foods, organic foods and food additives. Contamination points from biological hazards and food allergens will be identified and preventive measures developed. Food laws, regulations and regulatory and commercial grading standards will be examined.

### **Animal and Plant Biotechnology**

Subject Code: 012010

Learners will apply principles of chemistry, microbiology and genetics to plant and animal research and product development. They will describe the importance of biotechnology in society, and analyze the issues that have affected agricultural biotechnology. Students will apply genetic principles to determine genotypes and phenotypes. Students will describe the parts and functions of animal and plant cells and their importance in biochemistry.

### **Business Management for Agricultural and Environmental Systems**

Subject Code: 010115

Learners will examine elements of business, identify organizational structures and identify and apply management skills. Learners will develop business plans, financial reports and strategic goals for new ventures or existing businesses. Learners will use marketing concepts to evaluate the marketing environment and develop a marketing plan with marketing channels, product approaches, promotion and pricing strategies. Learners will practice customer sales techniques and apply concepts of ethics and professionalism while understanding related business regulations.

### **Agricultural and Environmental Systems Capstone**

Subject Code: 010190

The capstone course is an opportunity for students to solve problems and demonstrate that they have achieved the requisite knowledge and skills in their chosen Agricultural and Environmental Systems career field pathway. The course is designed to assess cognitive, affective and psychomotor learning and to do so in a student-centered and student-directed manner. The capstone requires the application of learning to a project that serves as an instrument of evaluation.

**Communications and Leadership**

Subject Code: 010110

Students will analyze attributes and capabilities of those in leadership positions and develop their communication and leadership skills in authentic situations. The course prepares students to apply journalistic, communication and broadcasting principles to the development, production, and transmittal of agricultural and environmental systems information.