

**Florida Department of Education
CURRICULUM FRAMEWORK**

Program Title: Advanced Concepts of Agriscience
Occupational Area: Agriscience and Natural Resources

Secondary

Program Numbers 8100330
CIP Number 0101.999902
Grade Level 11-12, 30, 31
Length 1 credit
Certification AGRI @4
VOC AGRI @4
AGRICULTUR 1 @2

- I. **MAJOR CONCEPTS/CONTENT:** The purpose of this course is to provide students who have completed or are currently completing an OCP in an agricultural program, a capstone experience in agriscience education. This course is designed to enhance competencies in the areas of agricultural science and research; biological and physical science; environmental principles; and principles of leadership. Laboratory-based activities are an integral part of this course. These include the safe use and application of appropriate technology, scientific testing and observation equipment.
- II. **LABORATORY ACTIVITIES:** A workstation is provided as required to support the training activities of the student.
- III. **SPECIAL NOTE:** FFA is the appropriate Career Student Organizations for providing leadership training and for reinforcing specific technical skills. Career Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065(8), FAC.

This course may be taken only by a student who has completed or is currently completing an occupational completion point in a job preparatory program. Outcomes 1-3 are required for all students. Each student will complete one or more of Outcomes 4-7 depending on the program the student has completed or is completing.

- IV. **INTENDED OUTCOMES:** After successfully completing this course, the student will be able to:
- 01.0 Conduct a research project in agriculture using the scientific method, interpret research information, and prepare and present a research project.
 - 02.0 Apply enhanced leadership and professional career skills.
 - 03.0 Illustrate agricultural applications of physical science concepts and principles.

Optional Outcomes:

- 04.0 Investigate the concepts, principles, and theories associated with the classification, growth, function, and reproduction of plants and soils.

- 05.0 Investigate concepts associated with animal taxonomy, life at the cellular level, organ systems, genetics, ecology, and related current issues to understand animal life and animal science as it pertains to agriculture.
- 06.0 Investigate how chemistry and physics principles are applied to the composition of foods, food nutrition, and microbiology as it is associated with the food science segment of agriculture.
- 07.0 Apply enhanced agricultural communication and/or agricultural sales skills.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

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Secondary Number: 8100330
Postsecondary Number:

All programs offering this course will provide instruction in outcomes 01.0, 02.0, and 03.0.

01.0 Conduct a research project in agriculture using the scientific method, interpret research information, and prepare and present a research project --The student will be able to:

- 01.01 Formulate hypotheses referencing prior research and knowledge.
- 01.02 Conduct controlled experiments or simulations to test hypotheses.
- 01.03 Collect, organize and analyze data accurately and precisely.
- 01.04 Formulate hypotheses referencing prior research and knowledge.
- 01.05 Design procedures to test the selected hypotheses.
- 01.06 Conduct systematic controlled experiments to test the selected hypotheses.
- 01.07 Report, display and defend the results of investigations to audiences that may include professionals and technical experts.
- 01.08 Estimate and suggest ways to reduce the degree of risk involved in activities in agriculture and related sciences.

02.0 Apply enhanced leadership and professional career skills - The student will be able to:

- 02.01 Identify and investigate a current agricultural issue.
- 02.02 Develop and present a professional presentation offering potential solutions to a current agricultural issue.
- 02.03 Enhance work based learning through an expanded Supervised Agricultural Experience (SAE).
- 02.04 Identify the opportunities for enhanced leadership development available through the National FFA Organization and/or professional organizations.
- 02.05 Enhance written and oral communications through developing resumes and interviews.

03.0 Illustrate agricultural applications of physical science concepts and principles --The student will be able to:

- 03.01 Compare physical, ecological and behavioral factors that influence interactions and interdependence of organisms.
- 03.02 Identify a design problem that has practical applications and propose possible solutions, considering such constraints as available tools, materials, time, and costs.
- 03.03 Analyze the properties of materials (e.g., mass, boiling point, melting point, hardness) in relation to their physical and/or chemical structures.
- 03.04 Analyze factors that influence the relative motion of an object (e.g., friction, wind shear, cross currents, potential differences).
- 03.05 Analyze reactions (e.g., burning of fuel, decomposition of waste) in natural and man-made energy systems.

- 03.06 Describe the need for organization, supervision, rules, policies and procedures.

Optional Outcomes: Each program offering this course will provide instruction on one or more of the following outcomes. Selection of outcome(s) will be based on the agricultural education program the student has completed or is completing.

- 04.0 Investigate the concepts, principles, and theories associated with the classification, growth, function, and reproduction of plant and soils --
The student will be able to:

- 04.01 Describe biotechnology and genetic engineering.
- 04.02 Discuss the benefits and risks of biotechnology.
- 04.03 Describe the functions of water in plant growth.
- 04.04 Identify major sources of water pollution and possible measures for its control.
- 04.05 Contrast the biochemistry and functions of plant cell membranes and cell walls.
- 04.06 Describe and give functions for common plant cell types.
- 04.07 Identify cell types and functions associated with the vascular, dermal and ground tissue systems in woody and herbaceous plant parts.
- 04.08 Compare and contrast periderm and epidermis and xylem and phloem.
- 04.09 Explain how differential gene expression is what determines which proteins are made, and how the proteins decide the characteristics and functions of a particular cell.
- 04.10 Describe methods of producing transgenic plants and ways in which they are used.

- 05.0 Investigate concepts associated with animal taxonomy, life at the cellular level, organ systems, genetics, ecology, and related current issues to understand animal life and animal science as it pertains to agriculture--The student will be able to:

- 05.01 Identify the major features of chordates, identify the highlights of vertebrate evolution (development of jaws, cartilage to bone, and water to land), and identify the distinguishing characters of fish, birds, and mammals.
- 05.02 Compare and contrast three types of chemical bonds: hydrogen, ionic and covalent bonds.
- 05.03 Describe the biochemistry and functions of animal cell membranes. In doing so, describe the fluid mosaic model of the membrane and the role of the cell membrane proteins in transporting materials in and out of cells.
- 05.04 Using examples relevant to animal science, track the events involved in expression of individual genes and compartmentalization of the resulting proteins.
- 05.05 Discuss four basic tissue types: epithelial, connective, muscle, and nervous.
- 05.06 Describe the chemical process in the formation of bones and muscles and the process of calcification and its impact on animal growth.
- 05.07 Describe homeostasis and how it is controlled.
- 05.08 Explain the flow of genetic information, and identify the central dogma: DNA transcription-mRNA-translation-protein.

- 05.09 Describe the purpose, function, and production of RNA, and explain how protein synthesis works.
- 06.0 Investigate how chemistry and physics principles are applied to the composition of foods, food nutrition, and microbiology as it is associated with the food science segment of agriculture--The student will be able to:
- 06.01 Describe composition and arrangement of functional groups found in biological systems.
 - 06.02 Discuss the chemical composition and structure of protein molecules including primary, secondary, tertiary, and quaternary structures.
 - 06.04 Discuss the biochemical and physiological functions of proteins, carbohydrates, lipids, vitamins and minerals.
 - 06.05 Explain thermodynamics and kinetics (e.g., reaction rates for affecting quality and destroying nutrients).
 - 06.06 Compare and contrast the chemical reactions initiated by the effect of heat, oxygen, acid, and light during processing and storage of foods.
 - 06.07 Identify the various food spoilage methods including microbial spoilage, chemical spoilage and their effect on food product shelf-life.
- 07.0 Apply enhanced agricultural communication and/or agricultural sales skills--The student will be able to:
- 07.01 Evaluate the effectiveness of a current communications or marketing campaign.
 - 07.02 Develop and implement a communications or marketing campaign for an agricultural product or issue.
 - 07.03 Apply enhanced written and oral communication skills by selecting the correct style, tone, and format appropriate for a variety of settings.
 - 07.04 Demonstrate characteristics of a responsible/ethical agricultural communicator.
 - 07.05 Select the proper communication medium and target audience for a current agricultural issue.