Indiana Department of Education
Academic Standards Content Framework

ADVANCED LIFE SCIENCE: FOODS

Advanced Life Science: Foods is a course that provides students with opportunities to participate in a variety of activities including laboratory work. This is a standards-based, interdisciplinary science course that integrates biology, chemistry, and microbiology in the context of foods, the global food industry, the composition of foods, the nutrition of foods, food and food product development, food processing, food safety and sanitation, food packaging, and food storage. Students enrolled in this course formulate, design, and carry out food-base laboratory and field investigations as an essential course component.

Advanced Life Science: Foods prepares students for many careers in agriculture, and more specifically, food science. These careers include but are not limited to: Dietary Management and Services, Food Distribution, Food Production, Inspection, Marketing, and Product Development.

Course Specifications

- DOE Code: 5072
- Recommended Grade Level: Grade 11-12
- Recommended Prerequisites: Chemistry, Biology, Introduction to Agriculture, Food and Natural Resources, Food Science, Nutrition and Wellness, Advanced Nutrition and Wellness,
- Credits: 1 credit per semester, maximum of 2 credits
- Fulfills a Core 40 Science requirement for the General, Core 40, Core 40 with Academic Honors and Core 40 with Technical Honors diplomas or counts as an Elective or Directed Elective for any diploma
- Qualifies as a Capstone Course for the General, Core 40, AHD, and THD diplomas
- Qualifies as a Quantitative Reasoning course for the General, Core 40, AHD, and THD diplomas

Dual Credit
This course provides the opportunity for dual credit for students who meet postsecondary requirements for earning dual credit and successfully complete the dual credit requirements of this course.

Application of Content
Intensive laboratory applications are a component of this course and may be either school-based or work-based or a combination of the two. Work-based learning experiences should be in a closely related industry setting. Instructors shall have a standards-based training plan for students participating in work-based learning experiences.

Career and Technical Student Organizations (CTSOs)
Career and Technical Student Organizations are considered a powerful instructional tool when integrated into Career and Technical Education programs. They enhance the knowledge and skills

students learn in a course by allowing a student to participate in a unique program of career and leadership development. Students are encouraged to participate in the CTSO most closely related subject matter areas.

Content Standards

Domain - Safety, Sanitation, and Quality of Food

Core Standard 1 Students analyze and manage operational and safety procedures in food product and processing facilities.

Standards

ALSF-1.1	Construct plans that ensure implementation of safety programs for food products, processing facilities, and the environment.
ALSF-1.2	Devise and implement strategies to maintain equipment and facilities for food products and processing systems.
ALSF-1.3	Describe the importance of performing quality-assurance tests on food products and applying corrective procedures as needed.
ALSF-1.4	Demonstrate procedures for safe handling of food products.
ALSF-1.5	Develop and implement operating procedures aligned with current industry regulations.

Core Standard 2 Students apply food safety and sanitation procedures in the handling and processing of food products to ensure food quality.

Standards

ALSF-2.1	Identify sources of contamination in food products and/or processing facilities and develop ways to eliminate contamination
ALSF-2.2	Examine, interpret, and report outcomes from safe handling procedures and results from quality assurance tests.
ALSF-2.3	Interpret and evaluate results of quality assurance tests on food products and examine steps to implement corrective procedures.
ALSF-2.4	Conduct and interpret microbiological tests for food-borne pathogens.
ALSF-2.5	Characterize, identify, and research the physical, chemical, and biological properties of microbes as they pertain to food spoilage and foodborne illness.

Core Standard 3 Students apply food safety procedures when storing food products to ensure food quality.

Standards

ALSF-3.1	Prepare plans that ensure implementation of proper food storage procedures.
ALSF-3.2	Implement and evaluate the effectiveness of a documented procedure used within a food product and processing facility and recommend improvements.

Domain - Nutrition, Biology, Microbiology, and Chemistry of Food Products

Core Standard 4 Students apply principles of nutrition, biology, microbiology, and chemistry to develop food products that provide a safe, wholesome, and nutritious food supply for local and global food systems.

ALSF-4.1 Analyze the physical, chemical, and biological properties of food products (e.g. oxidation, rancidity, hydrogenation, enzymatic browning, structures of essential nutrients, etc.) to evaluate nutritional value.

ALSF-4.2 Construct methods to design a healthy daily food guide for a variety of nutritional value.

ALSF-4.3 Design and conduct experiments to determine the chemical and physical properties of food products.

ALSF-4.4 Devise and apply strategies to determine what additives are utilized and why they are included in a variety of food products (artificial sweeteners, preservatives, color, etc).

ALSF-4.5 Develop and implement plans to engineer new food items using biochemistry concepts.

ALSF-4.6 Describe enzymes, the changes they cause in foods, and the physical and chemical parameters that affect enzymatic reactions.

ALSF-4.7 Analyze digestion and absorption of essential nutrients.

ALSF-4.8 Describe enzymes, the changes they cause in foods, and the physical and chemical parameters that affect enzymatic reactions.

Core Standard 5 Students apply principles of human behavior to develop food products to provide a safe, wholesome and nutritious food supply for local and global food systems.

Standards

ALSF-5.1 Determine a strategy to prepare and label foods according to the established standards of regulatory agencies.

ALSF-5.2 Design new food products that meet a variety of goals (e.g., consumer preferences, market, nutritional needs, regulatory requirements, etc.).

ALSF-5.3 Perform sensory-testing and marketing functions to characterize and determine consumer preference and marketing potential.

Domain – Students examine storage, distribution, and consumption of Food

Core Standard 6 Implement selection, evaluation, and inspection techniques to ensure safe and quality food products.

Standards

ALSF-6.1 Outline procedures to assign quality and yield grades to food products according to

industry standards.

ALSF-6.2 Develop, apply, and evaluate care and handling procedures to maintain original food quality and yield.

ALSF-6.3 Examine and respond to consumer concerns about the inspection and harvesting techniques of animals using accurate information based on regulatory, agency approved or industry-approved techniques.

ALSF-6.4 Evaluate and grade food products from different classifications of food products.

Core Standard 7 Students design and apply techniques of food processing, preservation, packaging, and presentation for distribution and consumption of food products.

Standards

ALSF-7.1 Design plans to formulate and package food products using a variety of weights and measures.

ALSF-7.2 Evaluate food quality factors on foods prepared for different markets (e.g., shelf life, shrinkage, appearance, weight, etc.).

ALSF-7.3 Devise and apply strategies to preserve different foods using various methods and techniques.

ALSF-7.4 Construct and implement methods of selecting packaging materials to store a variety of food products.

Core Standard 8 Students create food distribution plans and procedures to ensure safe delivery of food products.

Standards

ALSF-8.1 Devise and defend a strategy to determine ways for food distribution to reduce environmental impacts.

ALSF-8.2 Make recommendations to improve safety procedures used in food distribution scenarios to ensure a safe product is being delivered to consumers.

ALSF-8.3 Propose distribution plans for food products that meet specific market demands.

Domain - History and Current Developments of the Food Industry

Core Standard 9 Students examine the scope of the food industry by evaluating local and global policies, trends, and customs for food production.

Standards

ALSF-9.1 Articulate and defend a personal point of view on policies and legislation that affect the food products and processing system in the US or around the world.

ALSF-9.2 Devise and implement a strategy to create food products that meet a specific consumer trend in a specific market.

ALSF-9.3	Propose and implement culturally sensitive food processing and distribution practices.
ALSF-9.4	Predict and defend upcoming changes and trends in the food products and processing industry.
ALSF-9.5	Examine and respond to consumer concerns about the environment and safety of the food supply using accurate information regarding food products and processing systems and practices.
ALSF-9.6	Research and evaluate the feasibility of implementing a current or emerging technology to improve a current food product or process used in a facility.
ALSF-9.7	Demonstrate an ability to critically evaluate the validity of information that commonly appears in newspapers, magazines, radio, and television (e.g. food recalls)

Core Standard 10 Students identify and explain the purpose of industry organizations, groups, and regulatory agencies that influence the local and global food systems.

Standards

ALSF-10.1	Construct and implement methods to obtain data about organizations, groups, and regulatory agencies that affect the food products and processing industry.
ALSF-10.2	Construct and implement plans that ensure adherences to industry standards for food products and processing facilities.
ALSF-10.3	Analyze current government regulations.
ALSF-10.4	Research and evaluate the impact of supplemental government programs (eg. SNAP, Free & Reduced meals, WIC, etc.).

Domain - Careers

Core Standard 11 Students examine the scope of career opportunities in and the importance of food science to the economy.

Standards

ALSF-11.1	Evaluate the nature and scope of animal sciences in agriculture, society, and the economy
ALSF-11.2	Describe career opportunities and means to achieve those opportunities in plant and soil sciences
ALSF-11.3	Identify how key organizational structures and processes affect organizational performance and the quality of products and services

ALSF-11.4 Demonstrate those qualities, attributes and skills necessary to succeed in, or further prepare for, a chosen career while effectively contributing to society

Domain - Leadership

Core Standard 12 Students validate the necessity of leadership skills development in conjunction with participation in the national FFA Organization (FFA) and/or Family, Career and Community Leaders of America (FCCLA) as a critical component of the course.

Standards

ALSF-12.1 Communicate clearly, effectively, and with reason through speaking, writing, visuals, and active listening in formal and informal settings

ALSF-12.2 Recognize and explain the role of the CTSO in the development of leadership, education, employability, communications and human relations skills

ALSF-12.3 Examine roles within teams, work units, departments, organizations, inter-organizational systems, and the larger environment

ALSF-12.4 Acquire the skills necessary to positively influence others

ALSF-12.5 Develop a skill set to enhance the positive evolution of the whole person