

## Meat Science II

<b>Primary Career Cluster:</b>	Agriculture, Food, & Natural Resources
<b>Consultant:</b>	<a href="mailto:CTE.Standards@tn.gov">CTE.Standards@tn.gov</a>
<b>Course Code(s):</b>	C18HXX
<b>Prerequisite(s):</b>	<i>Meat Science I</i> (C18HXX)
<b>Credit:</b>	1 Credit
<b>Grade Level:</b>	11
<b>Elective Focus - Graduation Requirements:</b>	This course satisfies one of three credits required for an elective focus when taken in conjunction with other Agriculture, Food, & Natural Resources courses.
<b>POS Concentrator:</b>	This course satisfies one out of two required courses to meet the Perkins V concentrator definition, when taken in sequence in the approved program of study.
<b>Programs of Study and Sequence:</b>	This is the third course in the <i>Meat Science</i> program of study.
<b>Aligned Student Organization(s):</b>	FFA: <a href="http://www.tnffa.org">http://www.tnffa.org</a>
<b>Coordinating Work-Based Learning:</b>	All Agriculture students are encouraged to participate in a Supervised Agricultural Experience (SAE) program. In addition, teachers who hold an active WBL certificate may offer placement for credit when the requirements of the state board's WBL Framework and the Department's WBL Policy Guide are met. For information, visit <a href="https://www.tn.gov/education/educators/career-and-technical-education/work-based-learning.html">https://www.tn.gov/education/educators/career-and-technical-education/work-based-learning.html</a> .
<b>Available Student Industry Certifications:</b>	Credentials are aligned with postsecondary and employment opportunities and with the competencies and skills that students acquire through their selected program of study. For a listing of promoted student industry credentials, visit <a href="https://www.tn.gov/education/educators/career-and-technical-education/student-industry-certification.html">https://www.tn.gov/education/educators/career-and-technical-education/student-industry-certification.html</a> .
<b>Dual Credit or Dual Enrollment Opportunities:</b>	There are no statewide dual credit/dual enrollment opportunities for this course. If interested in establishing local opportunities, reach out to a local postsecondary institution.
<b>Teacher Endorsement(s):</b>	048, 150, 448, and 950
<b>Required Teacher Certifications/Training:</b>	None.
<b>Teacher Resources:</b>	<a href="https://www.tn.gov/education/educators/career-and-technical-education/career-clusters/cte-cluster-agriculture-food-natural-resources.html">https://www.tn.gov/education/educators/career-and-technical-education/career-clusters/cte-cluster-agriculture-food-natural-resources.html</a>  Best for All Central: <a href="https://bestforall.tnedu.gov/">https://bestforall.tnedu.gov/</a>

## Course at a Glance

CTE courses provide students with an opportunity to develop specific academic, technical, and 21st century skills necessary to be successful in career and in life. In pursuit of ensuring every student in Tennessee achieves this level of success, we begin with rigorous course standards which feed into intentionally designed programs of study.

Students engage in industry relevant content through general education integration and experiences such as career and technical student organizations (CTSO) and work-based learning (WBL). Through these experiences, students are immersed with industry standard content and technology, solve industry-based problems, meaningfully interact with industry professionals and use/produce industry specific, informational texts.

### Using a Career and Technical Student Organization (CTSO) in Your Classroom

CTSOs are a great resource to put classroom learning into real-life experiences for your students through classroom, regional, state, and national competitions, and leadership opportunities. Below are CTSO connections for this course, note this is not an exhaustive list.

- Participate in CTSO Fall Leadership Conference to engage with peers by demonstrating logical thought processes and developing industry specific skills that involve teamwork and project management.
- Participate in FFA career and leadership events (CDE/LDE) that align with this course including Agriscience Fair, Agricultural Communications, Agricultural Issues, Agricultural Sales, Extemporaneous Speaking, Floriculture, and Prepared Public Speaking.

### Using Work-Based Learning (WBL) in Your Classroom

Sustained and coordinated activities that relate to the course content are the key to successful work-based learning. Possible activities for this course include the following. This is not an exhaustive list.

- **Standards 1.1-1.4** | Invite an industry representative to talk about career opportunities, skills, and training required for employment.
- **Standards 2.1-3.2** | Visit a local or regional processing plant and have the plant manager discuss food safety protocols and product packaging regulations.
- **Standards 4.1-4.2** | Invite a local butcher to review and provide guidance on student developed processing, packaging, and marketing plans.

## Course Description

*Meat Science II* is an applied course for students interested in pursuing careers in meat or food science industries. Students will study principles related to animal structural anatomy, and a broad range of skills to become butchers, meat processors or meat processor managers, in commercial or private meat processing facilities. This course will focus on the principles related to food processing, safety, sanitation, preservation, food product packaging, and labeling food product marketing. Standards in this course are aligned with National Agriculture, Food, and Natural Resources Career Cluster Content Standards.

## Course Standards

### 1. Introduction to Food Processing

- 1.1. Careers: Investigate **occupations in food science**. Compare and contrast the **knowledge, skills, and abilities necessary for employment**, as well as educational levels or other required credentials.
- 1.2. Principles of Food Science: Summarize how **principles of food science** are applied for the conversion of agricultural commodities into consumer products. Determine how **food safety techniques** applied in the home, at retail establishments, and in industrial food processing environments benefit human health.
- 1.3. Safety: Review common **laboratory safety procedures** for **tool and equipment operation** in the food science 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.
- 1.4. Business Records: Demonstrate the ability to prepare **basic personal and business records** to complete **taxes, employment, and SAE related applications**, including resumes, budgets, income statements, balance sheets, cash flow statements, profit and loss statements, and equity statements.

### 2. Food Safety, Sanitation, Preservation, and Chemistry

- 2.1. Food Safety: Research and identify **types and general characteristics of microorganisms associated with foodborne illnesses**. Summarize safe food habits and practices by researching proper procedures for safe handling, storage, preparation, and cooking; to compose a checklist of general safety guidelines for red meat.
- 2.2. Sanitation: Describe and demonstrate **procedures and inspection standards for sanitation** in the food production industry. Demonstrate in a live setting or in a presentation format the ability to follow procedures for appropriate chemical selection, cleaning techniques, and insect and rodent control methods. Identify concepts and principles that provide the scientific foundation for current food sanitation standards.

2.3. Preservation: Differentiate among the various **microorganisms** that cause food spoilage and determine their life cycles. Compare and contrast the **application of food preservation methods** to prevent the growth of microbes in food. Outline the processes for heating, refrigerating, and freezing for food preservation.

2.4. Food Chemistry: Investigate and apply the concepts of **basic chemical processes and interactions of constituent components of foods**. Through experimentation and observation, identify chemical properties of food that are affected by production, processing, and storage.

### 3. Food Product Packaging and Labeling

3.1. Packaging and Labeling: Identify laws regulating the **packaging and labeling of food products** and summarize industry requirements. Demonstrate in a live setting or in a presentation the ability to perform packaging and labeling procedures for different food products.

3.2. Storage and Transportation: Research **storage and** transportation issues pertaining to packaged food products. Outline basic procedures to ensure the safe storage and transportation of meat and meat animal by-products.

### 4. Food Product Marketing

4.1. Economics: Discuss the **fundamental economic principles** (e.g., supply, demand, and profit) and the impact they have on the food science industry. Describe marketing considerations and methods of merchandising food products. Discuss how quality and yield grade factors affect product marketing.

4.2. Research and Development: Develop a food product and create **processing, packaging, and marketing plans** incorporating the skills learned in this course.

## Standards Alignment Notes

References to other standards include:

- SAE for All: [Evolving the Essentials](#): All agriculture students are encouraged to participate in a Supervised Agricultural Experience (SAE) program to practice and demonstrate the knowledge and skills learned in their agriculture courses.
- AFNR: [National Agriculture, Food, & Natural Resources \(AFNR\) Career Cluster Content Standards](#): Students who are engaging in activities outlined above should be able to demonstrate fluency in Standards CR, FPP, and PS at the conclusion of the course.
- P21: Partnership for 21st Century Skills [Framework for 21st Century Learning](#)
  - Note: While not all standards are specifically aligned, teachers will find the framework helpful for setting expectations for student behavior in their classroom and practicing specific career readiness skills.