Food Safety and Sanitation for Food Manufacturers On-Line Course

FDSC 497B
Fall 2009

Course #: FDSC 497B

Title: Food Safety and Sanitation for Food Manufacturers

Credits: 1

Faculty instructor: Dr. Luke LaBorde
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Office phone: 863-2298
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Course Website: All materials are accessed through ANGEL (https:cms.psu.edu)

Text book Information: There is no textbook requirement for this course. Course content and reference materials are available for downloading on the course website.

Prerequisite Courses: None

Registration Instructions: Because this course is offered through the ANGEL course management system, you will need permission to register for the course. If you are interested in taking this course, please email Dr. LaBorde at lfl5@psu.edu by **August 28, 2009**.

You must include the following information in your email:

1) Name
2) Student ID number, and
3) Email address.

You will receive an email message approximately one week later notifying you how to access the course.

Course Description and Goals:

Food Safety and Sanitation for Food Manufacturers is an introductory Internet course on food safety and sanitary practices for commercial manufacturers of food products. The course teaches the essentials of food safety, food microbiology, sanitary design principles for facilities and equipment, worker hygiene practices, water safety, correct procedures for cleaning and sanitizing, food defense, and HACCP.

Students who complete this course should know:

- How an effective food safety and sanitation program maintains profitability and brand reputation

- Potential biological, chemical, and physical hazards in food processing plants
- The scientific principles behind growth and destruction of pathogenic and spoilage microorganisms and practical strategies for keeping levels to a minimum
- Personal hygiene practices that minimize food contamination
- Fundamentals of sanitary equipment and facilities design and methods and technologies for cleaning and sanitizing food contact surfaces
- Expectations of regulatory agencies and third-party auditors and how to prepare for inspections
- Potential security hazards and methods for protecting products from deliberate contamination
- Hazards Analysis Critical Control Points (HACCP) concepts and how a sanitation program fits into a well-designed food safety plan

Students learn by reading the course material and completing an inspection of an on-campus food facility. You must complete the 12 chapters of the online course by Friday **November 13**. You should be able to complete all of the chapters well before that since, based on past experience, it takes only up to 10-12 hours to complete.

On Monday **November 16**, I will contact each of you by email and ask that you come to my office to receive instructions on completing the inspection portion of this course. You must complete the inspection by Friday **November 20**. You will have until **December 4th** to write up your results. On the week of **December 7**, we will arrange a time for the entire class to meet so that we can discuss your findings as a group. The date and location for the group meeting will be arranged by email.

The course instructor is available by email at any time for questions or comments. Office visits (Food Science Bldg 442) ideally should be scheduled at least one day ahead of the desired meeting time.

Grading Criteria: Students must take a pre-quiz and pass a post-quiz for each chapter. A minimum score of 70% is required to gain access to the next chapter. You may take the post-quiz as many times as you find necessary to achieve the score you wish to attain.

The course grade will be determined as follows: 60% online course grade (the average score for the 12 chapters) / 40% inspection report and discussion. A final letter grade will be based on the University plus/minus grading system:

Letter Grade	Final Average
A	93.0 – 100
A-	90.0 – 92.9
B+	87.0 – 89.9
B	83.0 – 86.9
B-	80.0 – 82.9
C+	77.0 – 79.9
C	70.0 – 76.9

Note: Because a minimum score of 70% is required to gain access to each succeeding chapter, students who complete each chapter cannot score lower than this. However, a failing or incomplete grade is possible if the student does not complete the course within the proscribed time limit.

Academic Integrity: Students may freely discuss the course materials with others as they read each chapter and take part in course activities. However, quizzes must be taken and reports must be written independently without assistance from other students. The meaning of academic integrity and examples of violations of academic integrity are provided in detail on the Penn State College of Agricultural Sciences website at http://students.cas.psu.edu/AcademicIntegrity.htm.

Course Outline:

Chapter 1. Foodborne Illness and Injury

- Microbial, chemical, and physical hazards and the types of illness or injury they cause.
- Foodborne disease intoxication vs. infection.
- Common symptoms of microbial foodborne disease.
- Populations particularly susceptible to foodborne disease.
- Food allergies and intolerances.
- Foods that account for 90% of known food allergenic reactions

Chapter 2. Food Microbiology

- Pathogenic, spoilage, and beneficial microorganisms.
- Microbial growth phases.
- Bacteria, viruses, parasites, and fungi in food.
- Why Listeria monocytogenes is not adequately controlled by refrigeration alone.
- Acid and low-acid foods and the potential for microbial growth.
- Water activity and microbial growth.
- Growth behavior of mesophiles, psychrotrophs, and thermophiles.
- The Temperature Danger Zone (TDZ) concept.
- Oxygen requirements for microorganisms.

Chapter 3. Food Protection

- Definition and examples of potentially hazardous foods.
- Situations in which raw materials, ingredients, or processed food products are exposed to TDZ temperatures.
- The "First In First Out" system and how it helps to maintain safe food.
- Storage conditions that prevent food contamination.
- Safe thawing of frozen foods and ingredients.
- Preventing post-processing contamination and microbial growth.
- Hazards associated with reduced oxygen packaging

Chapter 4. Worker Hygiene and Personal Practices That Cause Food Contamination

- Symptoms and conditions that would exclude a person from working with food.
- Personal hygienic practices that employees who handle food should follow at home to maintain overall cleanliness on the job.
- How protective clothing prevents food contamination.
- The proper way to wear a hair restraint.
- Personal practices on the job that can contribute to food contamination.
- Preventing cross-contamination when moving between unsanitary and sanitary food-handling areas.
- When and how to wash hands correctly.
- When and where to use disposable hand gloves.

Chapter 5. Safe Water Use

- Characteristics and uses of potable water in processing plants.
- Risks associated with municipal, ground, and surface water.
- Significance of detecting coliforms in the potable water supply.

- When water should be tested.
- Back flow prevention devices and how they work.
- Situations in which aerosols and floor splash can cause food contamination.
- Examples of a direct cross connections.
- Example of indirect cross connections.

Chapter 6. Design and Maintenance of Buildings and Grounds

- How trees, bushes, and grass outside buildings increase food safety risks.
- How improper grading of roads, parking lots, and receiving yards causes standing water problems.
- How the type and placement of interior and exterior light fixtures affects food safety risks.
- The best path for the movement of raw materials and ingredients through the plant.
- Minimizing contamination through proper construction of doors, windows, walls, floors, and drains.
- Maintaining proper air flow to minimize food safety risks.
- Proper placement of storage and waste containers inside and outside buildings.
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Chapter 7. Design, Use, and Maintenance of Equipment and Utensils

- Definition and examples of a food contact and non-food contact surfaces.
- Desirable characteristics of materials used as food contact surfaces.
- Examples of equipment sanitary design principles that minimize food safety risks.
- How proper placement of equipment minimizes food safety risks.
- How a preventative maintenance, repair, and calibration programs impact food safety.

Chapter 8. Food Safety Regulations

- Federal government agencies responsible for food safety regulations.
- Federal agency that regulates pesticides, sanitizers, and water quality.
- General rules for determining whether a food is regulated by federal or state and local regulations.
- Two general conditions that qualify a food as adulterated.
- The purpose and scope of Good Manufacturing Practices.
- What to do and what not to do when an inspector arrives at your processing establishment.

Chapter 9. Cleaning as Part of the Sanitization Process

- The 5 steps for cleaning and sanitizing and the goal of each.
- Why it is necessary to thoroughly clean a surface before sanitizing it.
- Properties of select cleaners and the soils they remove.
- Ideal characteristics to look for when purchasing a cleaner.
- Manual and mechanical cleaning procedures and which situations to use them.
- Precautions to take when using high pressure cleaning methods.

Chapter 10. Sanitizers and the Sanitization Process

- Characteristics of an ideal sanitizer.
- Advantages and disadvantages of various physical and chemical sanitizing treatments.
- How pH affects the activity of hypochlorite sanitizers.
- Strategies for monitoring for pathogens in food or on food contact surfaces.
- Advantages for using indirect methods over direct methods to verify sanitizing effectiveness.

- The concept and usefulness of ATP bioluminescence testing.
- The zone concept for developing a microbiological sampling program.

Chapter 11. Food Defense and Plant Security

- Recommendations for evaluating food security risks.
- Types of individuals capable of intentionally contaminating food and possible motivations for each.
- Critical security areas and why it is important to concentrate control efforts in these areas.
- Signs that indicate an employee might be a security risk.
- Examples of ways to limit access to critical interior and exterior security areas.
- Examples of ways to increase visibility on the grounds and inside food processing and storage buildings.

Chapter 12. Controlling Food Hazards – The HACCP Approach

- The HACCP concept and why it is more effective in preventing foodborne illness and injury than the traditional inspection system.
- The purpose of prerequisite programs.
- Factors that determine whether or not a food safety hazard is significant.
- Critical control points and monitoring procedures.
- The importance of record keeping in HACCP.