Food Science Extension & Institute for Food Safety

2019 Course Catalogue

Assisting businesses in New York State and beyond to improve the quality, safety, nutrition, and marketability of their product.

Cornell CALS
College of Agriculture and Life Sciences
The Department of Food Science at Cornell University is one of the premier programs worldwide for collaborative research and extension programming. Our faculty, staff, and students support cutting-edge research in chemistry, microbiology, engineering, biotechnology, nutrition, and physiology which has improved the nutritional value, safety, quality, affordability, and profitability of foods and beverages. These research initiatives are integrated with translational extension efforts that together help improve public health and stimulate business development.

The mission of the food science extension programs at Cornell is to assist businesses in New York State and beyond with the implementation of new technologies and production strategies which will improve the quality, safety, nutrition, and marketability of their product. Extension personnel, located at the Cornell University Campus in Ithaca, NY and at the NY State Agricultural Experiment Station (NYSAES) in Geneva, NY facilitate these activities through technology transfers, process validations, project incubation, piloting, crisis management support, workshops and web-based training, and consultation.

Through our work in research and extension, the food science extension programs have helped tens of thousands of food industry stakeholders. Measurable outcomes for these interactions have included bringing products to market, achieving regulatory compliance, reducing food safety risks, and adding value or extending product lines.

Visit us at: http://foodscience.cals.cornell.edu/
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### Training Delivery Types

- **On-Campus Training** takes place at the Cornell University Stocking Hall Conference Center, unless otherwise noted. All courses listed are open to the public.

- **On-Site Plant Training** these workshops can be offered off campus and at industry sites; courses at company sites can be limited to attendees from the hosting company. On-site courses are charged a flat fee (see page 26 for details).

- **Online, Self-Paced Training** includes background material to review prior to the start of the workshops and self-assessment quizzes.

- **Partnership Courses** are conducted in partnership with other organizations, including the New York State Department of Agriculture and Markets, Oregon State, Harvest NY, Penn State and Vermont Department of Health.

- **Multi-modal Courses** are online and hands-on.
Regulatory Programs and Industry Standards

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Good Manufacturing Practices Part 117 Online Course
The GMP Internet Course is designed to review the requirements of Part 117—Current Good Manufacturing Practice, Hazard Analysis, and Risk-Based Preventive Controls for Human Food in Title 21 of the U.S. Code of Federal Regulations. As part of the FDA’s Food Safety Modernization Act, revisions were made to the Current Good Manufacturing Practice regulation to update and clarify it. The regulation outlines the basic sanitary controls that are required for all food processing plants, wholesale or distribution firms, and warehouses or food storage facilities that handle, store or process FDA regulated food. The course provides the text of each section of this regulation along with an explanation of its intent, examples and strategies for compliance with these requirements, and resources.

Implementing SQF Systems
(2 Day Course)
This workshop is designed to give participants an understanding of the SQF Code, how to implement these requirements in a food processing plant, as well as food ingredient and food packaging plants to achieve or maintain SQF Certification. It is required that students have completed a HACCP Course of at least 16 hours prior to taking this course.

Produce Safety Alliance Grower Training Course (Basic Level)
(1 Day Course)
This course is one way to satisfy the FSMA Produce Safety Rule requirement outlined in § 112.22(c) that requires ‘At least one supervisor or responsible party for your farm must have successfully completed food safety training at least equivalent to that received under standardized curriculum recognized as adequate by the Food and Drug Administration.’ The course will provide a foundation of GAPs and co-management of natural resources and food safety, FSMA Produce Safety Rule requirements, and details on how to develop a farm food safety plan. After attending the course, participants will receive a certificate from the Association of Food and Drug Officials (AFDO) that verifies they have completed the training course.
Preventive Controls for Human Food
(2.5 day course, 2.5 CEUs)
The Current Good Manufacturing Practice, Hazard Analysis, and Risk-based Preventive Controls for Human Food regulation is intended to ensure safe manufacturing/processing, packing and holding of food products for human consumption in the United States. The regulation requires that certain activities must be completed by a “preventive controls qualified individual” who has “successfully completed training in the development and application of risk-based preventive controls”. This course developed by the FSPCA is the “standardized curriculum” recognized by FDA; successfully completing this course is one way to meet the requirements for a “preventive controls qualified individual.”

These courses are taught by Lead Instructors trained by the FSPCA, who have been instructed in how to teach the FDA-recognized standardized curriculum.

*Course description provided by the Food Safety Preventive Controls Alliance

Preventive Controls for Animal Food
(2.5 day course, 2.5 CEUs)
The Current Good Manufacturing Practice, Hazard Analysis, and Risk-based Preventive Controls for Animal Food regulation is intended to ensure safe manufacturing/processing, packing and holding of food products for animal consumption in the United States. The regulation requires that certain activities must be completed by a “preventive controls qualified individual” who has “successfully completed training in the development and application of risk-based preventive controls, or is otherwise qualified through job experience to develop and apply a food safety system”. This course developed by the FSPCA is the “standardized curriculum” recognized by FDA; successfully completing this course is one way to meet the requirements for a “preventive controls qualified individual.”

These courses are taught by Lead Instructors trained by the FSPCA and co-taught with Cooperative Feed Dealers, who have been instructed in how to teach the FDA-recognized standardized curriculum.

*Course description provided by the Food Safety Preventive Controls Alliance.

Foreign Supplier Verification Programs
(2 day course, 2 CEUs)
This course will provide participants with the knowledge to implement the requirements of the “Foreign Supplier Verification Programs (FSVP) for Importers of Food for Humans and Animals” regulation of the U.S. Food and Drug Administration (FDA). This regulation is one of a number of regulations and guidance that implement the provisions of the 2011 Food Safety Modernization Act (FSMA), which focuses on safe food practices. This course is designed for:

1. U.S.-based importers who meet the definition of “importer” in the FSVP rule, which includes those who own or are the consignee of food at the time of entry, or, if no owner or consignee exists, the U.S. agent or representative of the foreign owner.
2. Others who have an interest in ensuring that the requirements of the FSVP rule are met, including brokers, exporters, foreign suppliers of food that will be exported to the U.S., persons/business owners who currently buy food from foreign sources, and representatives of foreign governments.

The FSVP curriculum was designed by regulatory, academia, and industry professionals and developed with funding from FDA as part of the FSPCA. In contrast to the Preventive Controls (PC) rules, the FSVP rule does not require you to attend a training program following a “standardized curriculum” recognized by FDA. Attending this course, however, will help you understand the FSVP requirements and how those requirements can be met in your particular circumstance.

*Course description provided by the Food Safety Preventive Controls Alliance.
Course Information

**Better Process Control School**

*(Low Acid—4 days; Acidified—2 days)*

A training program for the processed food industry to prepare industry practitioners and help companies meet federal regulations. The course is beneficial to personnel in plants that pack and thermally process low-acid foods and acidified foods in hermetically sealed containers, including canned foods, aseptically processed and packaged foods, and pickled products. Cornell University is part of the network of universities that deliver the Better Process Control School in partnership with the GMA Science and Education Foundation (SEF) utilizing U.S. Food and Drug Administration (FDA) approved curriculum.

The FDA regulations in 21 CFR 108, 113, and 114 became effective May 15, 1979, requiring that each processor of low-acid or acidified foods operate with a certified supervisor on hand at all times during processing. These regulations are designed to prevent public health problems in low-acid and acidified canned foods. The BPCS course also meets U.S. Department of Agriculture’s (USDA) Food Safety and Inspection Service (FSIS) regulations 9 CFR 318.300 and 381.300 for thermally processed meat and poultry products implemented on June 19, 1987.

The BPCS subject areas include thermal processing system operations, microbiological food safety, sanitation, container handling, record keeping, equipment operations, acidification, and container closure evaluation programs for low acid and acidified canned foods.

The BPCS program is an important and valuable educational opportunity for mid-level managers and employees of food processing plants that utilize thermal processing. The course is an excellent platform to improve food safety training for food safety and quality assurance personnel, individuals who work with canned, aseptic and flexible packaged food products, academia, and government auditors and inspectors.

### Calendar

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<td>Cornell AgriTech (TBD)</td>
<td>Food Processing, Regulatory</td>
<td>On-Campus On-Site</td>
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Meet the Team

**Olga Padilla-Zakour**

*Professor and Department of Food Science Chair, Institute for Food Safety*

*E-mail: oip1@cornell.edu*

*Expertise: Safety and stability of plant-based foods; formulation and processing of acidified and water activity controlled-foods; juice technology; food entrepreneurship.*

**Randy Worobo**

*Professor, Institute for Food Safety*

*E-mail: rww8@cornell.edu*

*Areas of Expertise: Food safety; food microbiology; fruit and vegetable safety.*

**Bruno Xavier**

*Extension Associate, Cornell Food Venture Center Institute for Food Safety*

*E-mail: bmw2@cornell.edu*

*Areas of Expertise: Food Microbiology, formulation and safe manufacturing of acidified and water activity controlled-foods; FSMA Preventive Controls for Human Food.*
About the Institute

The Cornell Craft Beverage Institute (CCBI) was created in 2018 to formally join Cornell’s many fermented beverage outreach functions under one umbrella. A synergistic collaboration of extension programs in wine, beer, cider, distillates and fermented whey, CCBI offers training for industry members and consumers interested in all types of fermented and distilled beverage production. Areas of emphasis include:

- Grain and fruit fermentations
- Distillation techniques
- Analytical techniques
- Sensory science and evaluation methods
- Sanitation
- Tasting room strategies

The programs that make up CCBI offer technology transfer and expertise for specific beverage industries.

The Cornell Enology Extension Lab (CEEL) works with the wine industry to create educational programs that support the growth and improved quality of premium wines throughout the state. CEEL facilities include the Vinification & Brewing Technology lab, where fermentations are conducted in collaboration with research projects and applied trials; and the New York Wine Analytical Lab, where products may be submitted for troubleshooting, routine analysis or sensory appraisal.

The Cornell Brewing Extension Lab (CBEL) offers hands-on training to improve the quality of New York beer and brewing materials. CBEL is equipped with a service analysis facility offering testing for quality parameters such as hop harvest timing and beer off-flavor and spoilage detection. A new ½ barrel research brewery allows controlled production of beer as an applied research tool to test both raw materials and brewing processes. CBEL offers training for members of the brewing industry looking to refine their skillset, those seeking competitive qualifications for brewery employers, and offers introductory brewing concepts for new brewers.

The Cider Institute of North America (CINA) is a non-profit organization made up of passionate cider industry professionals and educators with a mission to create a quality-driven and sustainable cider industry through education and research. CINA teams with academic partners, including Cornell University (lead academic institution), Oregon State, Washington State and Brock, to offer a Foundation Course designed to develop concrete relationships with education partners to help producers better understand the opportunities and risks facing the industry as a whole. Cider Institute Certification is
offered as an option to all students completing these programs, prompting the development of new talent within the industry.

Cornell has partnered with CARL Artisan Distilleries and Brewing Systems to present distilling workshops for more than ten years. CARL owner Alexander Plank, Technical Sales Manager Nicolas Haase and Cornell staff instruct attendees in lectures and practical demonstrations. With distillery installations at the teaching winery in Ithaca and in the Vinification & Brewing Laboratory at Cornell AgriTech in Geneva, the CCBI can hold workshops on either campus. This workshop traditionally features a visit to one of the commercial distilleries in the area on the first night.

**Course Information—Enology**

CEEL offers the **EnoCert curriculum**, a series of 1-2 day short courses which can be taken individually or in a variety of certificate tracks. EnoCert provides novices with wine production fundamentals, but also offers industry veterans courses in targeted topics of interest.

**EnoCert 101: Basic Viticulture & Enology**

(2 Days, Hands-On)

EnoCert 101: Basic Viticulture & Enology is designed for consumers and members of the wine industry who have little or no background in grape growing and winemaking. Participants will leave with a working knowledge of the core concepts of grape and wine production and a specific understanding of the opportunities and challenges inherent to cool-climate production regions.

During the first day, a series of lectures and group activities will cover vineyard site parameters, the components and function of grape vines and trellis systems, and the major threats to wine grape production. Viticultural instruction will culminate in a visit to a local vineyard showcasing several grape cultivars important to the region. On the second day, participants will explore production steps for specific wine types through lectures, group work, and sensory evaluation. Participants will learn processing variables for white, red, rosé wines, and will understand the key decisions required to influence wine style.

EnoCert 101 is the entry point for the EnoCert certification program, and is required for both the Harvest Technology and Tasting Room Educator certificates offered by the Cornell Enology Extension Laboratory. Participants may take this course as a stand-alone program, or as a component of the certificate curriculum.

Tuition for EnoCert 101 is $300. *(Tuition for EnoCert 101, 201, and 202 together is $800).*

**Learning Outcomes**

- Grapevine structure and function
- Site selection parameters
- Trellis systems
- Grapevine pests and diseases
- Winemaking plans for specific wine types
- Wine processing parameters and decisions
EnoCert 201: Wine Sensory Analysis and Description
(2 Days, Hands-On)

Attendees of EnoCert 201: Wine Sensory Analysis and Description will be guided through an in-depth exploration of their own sensory capabilities, and the ways in which their unique sensory perception influences their interactions with wine. Based on current sensory science, this course can serve as a starting point for new wine industry members or to complement more traditional wine evaluation programs.

The course is largely experiential, consisting of short lectures and related sensory exercises. Participants will start with exercises demonstrating the range and limitations of their own senses, including learning their own thresholds for important wine components, and their supertaster status. Further exercises will cover the concept of sensory balance in wines and identification of common wine flaws. Participants will then apply their skills in a series of benchmark tastings of significant wine types.

EnoCert 201 is a core course for the EnoCert certification program, and is required for both the Harvest Technology and Tasting Room Educator certificates offered by the Cornell Enology Extension Laboratory. Participants may take this course as a stand-alone program, or as a component of the certificate curriculum.

Tuition for EnoCert 201 is $400. (Tuition for EnoCert 101, 201, and 202 together is $800).

Learning Outcomes
- Defining and differentiating between smell, taste, and ‘flavor’
- Thresholds for key wine aroma and taste components
- Components of wine mouthfeel
- Expert and novice use of wine descriptors
- Common wine types

EnoCert 202: Tasting Room Sales Strategies
(2 Days, Hands-On)

EnoCert 202: Tasting Room Sales Strategies is designed for current or prospective tasting room staff who are new to the industry or to the region. Most consumers’ first contact with the New York wine industry is in a tasting room, so understanding their interests, motivations, and educational needs is key to promoting the industry as a whole and increasing individual winery sales. In this course, attendees will learn how to engage guests to create a fun and profitable tasting room experience.

EnoCert 202 is the last course required for the Tasting Room Educator certificate offered by the Cornell Enology Extension Laboratory. Participants may take this course as a stand-alone program, or as a component of the certificate curriculum.

Tuition for EnoCert 202 is $250. (Tuition for EnoCert 101, 201, and 202 together is $800).

Learning Outcomes
- Common types of wine consumers
- Wine consumer buying habits
- Factors driving regional tasting room sales
- Building a positive consumer experience
EnoCert 203: Winery Safety and Sanitation

(Online lectures, approx. 6 hours)

EnoCert 203: Winery Safety and Sanitation is intended for all cellar personnel. Safety and sanitation are often overlooked in winemaking courses, but are essential to the production of high quality—and more importantly, LEGAL—wines. In this digital learning course, participants will learn to identify and address safety hazards, the role of OSHA and other regulatory bodies, the difference between cleaning and sanitizing, and common areas of contamination in a winery setting.

EnoCert 203 is the final course required for the Harvest Technology certificate offered by the Cornell Enology Extension Laboratory. Participants may take this course as a stand-alone program, or as a component of the certificate curriculum.

Tuition for EnoCert 203 is $225.

Learning Outcomes

- Winery safety regulations
- Personal safety issues
- Fundamentals of cleaning and sanitation
- Common microbial and chemicals hazards in the winery

EnoCert 302: Wine Microbiology

(On-line lectures, approx. 6 hours, and 1 day Hands-On)

EnoCert 302: Wine Microbiology is intended for participants who have some winery experience but have little or no specific training in wine microbiology. On-line lectures will cover the growth cycle of Saccharomyces cerevisiae, optimal parameters for fermentation, non-Saccharomyces yeast strains, lactic acid bacteria and malolactic conversion, acetic acid bacteria, and molds. In the hands-on portion of the course, participants will apply information from the lectures to understand the impacts of winemaking decisions on microbial issues, diagnosis of fermentation problems, and critical control points for wine quality.

EnoCert 302 is one of four intermediate courses offered by the Cornell Enology Extension Laboratory, and is required for the certificate in Wine Production & Analysis. Participants may take this course as a stand-alone program, or as a component of the certificate curriculum.

Tuition for EnoCert 302 is $450.

Learning Outcomes

- Common wine microorganisms and their role in wine production
- Factors influencing yeast and bacterial metabolism
- Identifying, preventing, and managing major microbial threats to wine quality

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<td>EnoCert 201: Wine Sensory Analysis and Description</td>
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Course Information—Beer

**Beer Raw Materials Quality**
*(2 Days, Hands-On)*

Beer Raw Materials Quality is designed to assist brewers in selecting and evaluating raw materials for use in the brewing process; it will also benefit hop and malt suppliers seeking a deeper understanding of the quality measures important to the brewing process. Methods of assessing quality, such as visual inspection, sensory analysis, and basic chemical analysis, will be covered.

The course will begin with a series of lectures covering raw materials used in the brewing process and how their composition influences beer production and quality. Methodologies for determining acceptable raw materials quality for brewing will be discussed, with a focus on standard industry measures outlined by the American Society of Brewing Chemists. During the second day, participants will get hands-on experience evaluating hops and malt samples, and learn how to interpret lab results and specification sheets.

Tuition for Beer Raw Materials Quality: $300

**Learning Outcomes**

- Hop Quality: hand-rub evaluation/hop tea, moisture, alpha & beta acids, total oil
- Malt Quality: hot steep, FAN, diastatic power, moisture, color, extract
- Best practices for handling and storage of raw materials
- Common beer quality issues directly related to raw materials

**Beer Sensory Evaluation**
*(2 Days, Hands-On)*

Beer Sensory Evaluation is designed for both the novice and experienced brewing professional; it will review fundamentals of sensory science and help attendees develop individual sensory aptitude. After an introduction to sensory science, a series of interactive lectures will guide the class through tasting and evaluating the flavors and aromas most characteristic to beer, including as basic tastes, the interplay between hop aroma and bitterness, fermentation-derived flavors, and beer off-flavors.

During day two, participants will learn first-hand how sensory testing can be used in the brewery to detect flaws, examine differences due to raw materials quality or substitution, and create descriptive language for product development, marketing or branding.

Tuition for Beer Sensory Evaluation: $400
Learning Outcomes
- Fermentation and yeast derived flavor
- Beer off-flavor training
- Hop aroma and bitterness
- Individual thresholds for important beer flavor compounds
- Common sensory tests (triangle, duo-trio, ranking)
- Descriptive analysis and lexicon usage

Beer Microbiology
*(On-line lectures, approx. 6 hours, and 1 day hands-on)*

Beer Microbiology is intended for the professional brewer interested in building a suitable program for managing yeast and microbiological beer spoilers in the brewery. Materials from this course will assist brewers in developing robust practices for yeast handling: a practice essential to maintaining consistency in flavor, fast fermentations, and high-quality beer.

A series of online lectures will cover yeast cell morphology and dynamics of fermentation, yeast propagation and storage, and detecting beer spoilage organisms through traditional plating and advanced molecular techniques. In the hands-on portion of this short course, participants will have the opportunity to hone their benchtop skills in the Cornell Brewing Extension Lab by practicing sterile technique, plating, basic microscopy, staining and identification of beer spoilers.

Tuition for Beer Microbiology: $450

Learning Outcomes
- Yeast metabolism and fermentation biochemistry
- Basic microbiology: sterile technique, plating, microscopy
- Yeast viability and vitality
- Detecting beer spoilage organisms

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<td>Beer Sensory Evaluation</td>
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<td>Beer Microbiology</td>
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Course Information—Cider and Spirits

Cider Production—A Foundation

(4.5 Days, Hands-On)

The Cider Foundation course is designed to improve participants understanding of all aspects of cider. The focus of this course is to provide a basic understanding and appreciation of the main practices involved with cider and perry production and appreciation. The course consists of lectures, hands-on training and laboratory analysis, workshops, and cider tastings.

The lectures will focus on historical development of the cider industry, orcharding, legal requirements, business marketing, fermentation management, and detailed step-by-step production processes. Hands-on practical training will cover yeast handling and establishment of fermentation. Laboratory sessions will provide an introduction to juice composition as well as the chemistry and microbiology of cider. Participants will learn how to measure ph, titratable acidity, specific gravity, free and total sulfur dioxide. Workshops will guide participants through product development; from raw materials to finished product. Tasting sessions will offer training in cider sensory analysis and development of organoleptic assessment notes for personal product portfolios. Participants will also taste their finished ciders from the product development workshop and experience ciders from around the world.

This course is also designed for individuals who wish to gain a recognized industry qualification, The Foundation Certificate in Cider and Perry Production. Passing an exam on the fifth day of the course as well as completing a sensory analysis portfolio of six cider or perry products during the class can achieve this certificate.

Tuition for Cider Production—A Foundation is $1400.

Learning Outcomes

- Cider and Perry Production Methods
- Cider Quality/Sanitation
- Laboratory analysis
- Sensory analysis

Cider Production—Building Expertise

(4 Days Hands-On)

The Cider Building Expertise course is designed for individuals who have previously attended an introductory cider-making course, or those who have industry experience. The focus of this course is to provide an in depth look at cider production and control. The course consists of lectures, hands-on training and laboratory analysis, group workshops, and cider tastings.

The lectures will focus on production planning, fermentation, maturation, detailed step-by-step production processes, and production technology. Laboratory sessions will provide an introduction to microorganisms associated with cider, potential problems and prevention. Participants will learn how to measure CO2 level, titratable acidity, alcohol by volume, free and total sulfur dioxide. The course will provide in-depth sensory analysis training through cider tastings including the use of flavor wheels, sensory faults, and consumer trials. This course will also provide an introduction to less common cider practices, including keeving, in-bottle fermentation, juice and vinegar production.
A key aspect of this course involves group cooperation during a new product development project. This project focuses on production planning, blending, recipe development, cost analysis and laboratory analysis of cider.

Tuition for Cider Production-Building Expertise is $1800.

**Learning Outcomes**
- Production planning and control
- Biotechnology of Cider Production
- Fermentation and Maturation
- Sensory Analysis
- Adding Value
- Quality Assurance/Quality Control

**Distilling Workshop**
*(2 Days, Hands-on)*

The Distilling workshop is tailored to those currently active, or contemplating entry into the distilled spirits industry, it addresses the basic principles of distilling production, marketing, and sensory analysis. The course consists of lectures, demonstrations, and spirit tasting sessions.

Lectures will provide information about distillery design evolution, traditions, and concepts, as well as different technologies for brandies, eau-de-vie, grappa, whiskey, and rum. Participants will also learn about fermentation principles, properties of barrel aging, and business start-up considerations. Practical demonstrations of commercial stills will display informative processes for producing quality spirits, high-proof distillation-rectification, treatment of distillate, and continuous distillation technology. Though sensory analysis participants will evaluate examples of head, heart, and tail cuts as well as discover spirit flavor chemistry.

Tuition for the Distilling Workshop is $650.

**Learning Outcomes**
- Basic distilling procedure
- Quality spirit production
- Spirit flavor chemistry

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The Cornell Dairy Foods Extension Certificate program offers comprehensive training for dairy processors of all sizes within New York State and beyond. In New York State alone, dairy processing represents 18% of manufacturing jobs within 350 regulated plants. Together with dairy farmers that represents nearly 20,000 employees—and employees need to be trained.

Our Dairy Extension program provides training and certificates in four areas including:

- The Science of Yogurt and Fermented Dairy Products (Basic and Advanced)
- Fluid Milk Processing for Quality and Safety
- Membrane, Evaporation and Drying Technology
- The Science of Cheese Making (Basic and Advanced)

Courses aim to provide comprehensive basic training to dairy processors in vital topics such as milk quality and safety, dairy microbiology, Good Manufacturing Practices, unit operations, cleaning and sanitizing, food safety plans, audits, and state and federal regulations.

Processing courses such as The Science of Cheese, The Science of Yogurt, and Fluid Milk Processing combine science with hands-on in-plant experiences utilizing equipment found in actual plant environments. Each participant receives a reference manual on the subject matter for later use.

To increase the amount of time dedicated to these hands-on experiences, several of the courses taught by the Cornell Dairy Foods Extension Program are taught in a hybridized style which include readings and lectures are on-line and self-paced prior to an on-campus hands-on session. This innovative system allows employees to do courses work at a time that is convenient to their schedule and reduces the number of hours away from the plant.

Dairy Science and Sanitation, Food Safety Plans/HACCP, and Preventive Controls Qualified Individual courses are also available as site-specific in-plant trainings and our team will occasionally offer or host stand-alone classes or courses at Cornell that are not part of our certificate program and that cannot be used towards the certificates offered.

While our mission is to provide information and training programs to the dairy production and processing sectors, consumer questions and concerns are addressed as well. The Dairy Foods Extension team is available to assist Cornell Cooperative Extension (CCE) in their training and outreach needs at the county level.
Meet the Team

**Sam Alcaine**  
*Assistant Professor of Dairy Fermentations*  
E-mail: sda23@cornell.edu  
**Areas of Expertise:** Dairy cultures and fermentation, Antibiotic Resistance in Salmonella; Good Manufacturing Practices, FSMA Preventive Controls for Human Food.

**Dave Barbano**  
*Professor of Food Science*  
E-mail: dmb37@cornell.edu  
**Areas of Expertise:** Dairy processing technologies, cheese chemistry and functionality, chemical and infrared analysis of milk and dairy products, farm management technologies and milk quality, milk synthesis metabolism.

**Carmela Beliciu**  
*Extension Aide*  
**Phone:** (607) 255–2912  
E-mail: clb352@cornell.edu  
**Areas of Expertise:** Working with business owners to facilitate their use of FPDL facilities, small-scale dairy production, specialty cheese instruction and manufacture, Good Manufacturing Practices.

**Kimberly Bukowski**  
*Extension Professional*  
**Phone:** (607) 254–3313  
E-mail: krb14@cornell.edu  
**Appointment:** Extension  
**Areas of Expertise:** Dairy plant auditing; food safety systems; GFSI-Safe Quality Foods; Good Manufacturing Practices; dairy manufacturing; ice cream; FSMA Preventive Controls for Human Food.

**Monika Crosby**  
*Extension Aide*  
**Phone:** (607) 255–6806  
E-mail: mlc258@cornell.edu  
**Areas of Expertise:** Course coordination and data management.

**Louise M. Felker**  
*Extension Support Specialist*  
**Phone:** (607) 255–7098  
E-mail: lmf226@cornell.edu  
**Areas of Expertise:** Workshop/short course organization and planning, food safety systems, Good Manufacturing Practices, social media/web development.

**Nicole Martin**  
*Associate Director*  
*Milk Quality Improvement Program*  
E-mail: nhw6@cornell.edu  
**Areas of Expertise:** The transmission, control and detection of dairy associated spoilage microorganisms and pathogens.

**Robert D. Ralyea**  
*Sr. Extension Associate*  
**Phone:** (607) 255–7643  
E-mail: rdr10@cornell.edu  
**Areas of Expertise:** Dairy systems environmental microbiology, product processing and regulations; small-scale dairy production, general food security & risk assessment; FSMA Preventive Controls for Human Food.

**Alex Solla**  
*Extension Support Specialist*  
**Phone:** (607) 255-3459  
E-mail: ahs24@cornell.edu  
**Areas of Expertise:** Course coordination and data management.

**Martin Wiedmann**  
*Gellert Family Professor in Food Safety, Institute for Food Safety*  
**Phone:** (607) 254–2838  
E-mail: mw16@cornell.edu  
**Areas of Expertise:** *Listeria monocytogenes*, pre-harvest food safety, molecular pathogenesis, microbial ecology and epidemiology.
Registration and Confirmation
Please visit the Cornell Dairy Foods Extension website to register for courses: dairyextension.foodscience.cornell.edu.

Please contact Louise Felker at: lmf226@cornell.edu with any special payment circumstances prior to registering.

Cancellation Policy
Registration must be canceled by the close of business on the Friday two weeks prior to the start of the course in order to receive a full refund. Substitute registrations from the same company will be accepted at any time prior to the start of the course.

No refunds will be given to individuals that fail to attend to their scheduled course.

Required Materials
All required course materials will be provided by Cornell University Dairy Foods Extension. Participants will be notified if the course requires use of a personal laptop computer during the hands-on sessions.

Courses that include an online, self-paced portion require that the online materials be completed prior to the start of the hands-on workshop.

Certificate of Achievement
Attendees must sign in at the beginning of the workshop and attend all days of the workshop to qualify to receive a certificate of achievement. Attendees must also score a 70 or higher on the course post-test to pass the course and receive their certificate. One retake of the post-test is allowed per attendee.

The certificate of achievement and the graded post-test will be mailed to each attendee upon completion of the course.

The Cornell University Dairy Foods Extension team, with the Department of Food Science in the College of Agriculture and Life Sciences, is a diverse group of faculty and staff with extensive knowledge that spans nearly all aspects of dairy science and technology.
Steps to Earning a Certificate

Successful completion of Core Courses and appropriate Specialized Course required for Certification. Certificate valid for 3 years, requires 8 CEUs for renewal.

Core Courses
- 101 Dairy Science and Sanitation
- 201 Food Safety Systems and HACCP for Dairy and/or
- 202 Preventive Controls Qualified Individual

Specialized Courses
- 301 The Science of Cheese (Basic Level)
- 302 The Science of Yogurt and Fermented Dairy Products (Basic Level)
- 203 HTST/NYS Broken Seal Program and/or
- 204 Vat Pasteurization

Advanced Courses
- 401 The Science of Cheese (Advanced Level)
- 402 The Science of Yogurt and Fermented Dairy Products (Advanced Level)
- 403 Fluid Milk Processing for Quality and Safety (Advanced Level)

Certification as an Advanced Cheese Maker and/or Advanced Yogurt Maker requires related specialized certification, completion of the Course, completion of an oral exam, and more than 3 years experience in respective field (supported by 2 references). Certificate is valid for 3 years, requires 16 CEUs for renewal.
Core Courses

These courses are required to complete any chosen track for the specialized Certificate Programs.

Dairy Science and Sanitation

*(On-line lectures/1.5 days hands-on, 2 CEUs)*

The Dairy Science and Sanitation Workshop is tailored to dairy processing personnel and is designed to help participants understand the basic principles of dairy science and safety, as well as emphasize dairy processing establishment needs related to dairy sanitation to ensure that proper programs are conducted in their establishments.

The course consists of on-line lecture sessions that will cover basic dairy science, including composition of milk, dairy microbiology, dairy food safety, as well as an overview of dairy regulations. Participants will also learn the basics of cleaning and sanitizing principles, unit operations—both raw milk production and receiving, and dairy processing, plant equipment and design, general control of pathogenic and spoilage microorganisms, in depth information on cleaning and sanitizing chemicals, their properties and applications, and a discussion on CIP and COP systems and common errors seen in the industry. The course also provides hands-on sessions where both CIP and COP principles will be applied.

**Learning Outcomes**

- Basic dairy microbiology/food safety overview
- Good manufacturing practices/dairy sanitation
- Milk composition and unit processing operations
- Dairy regulations/Food Safety Modernization Act

UHT/High Temperature Short Time (HTST) Pasteurizer Operator Workshop

*(3 day course, 3 CEUs)*

This workshop is designed for pasteurizer operators, but should be beneficial to all involved with milk pasteurization, including production, QA/QC & maintenance personnel. The course is instructed by industry experts and representatives from NYS Agriculture & Markets and provides an overview of the design, operation, cleaning and maintenance of HTST systems. All required regulatory tests for HTST pasteurizers will be discussed and/or presented in a hands-on format to meet the training requirements for performing HTST system testing under the NY State Broken Seal Policy. Information on HHST/UHT systems will be covered. Background in dairy microbiology, product safety & quality will also be provided.

**Learning Outcomes**

- HTST and UHT operation components
- Regulatory requirements for HTST operation
- Cleaning and sanitizing HTST programs
- Requirement as part of NYS Broken Seal Program
Specialized Courses

The Science of Cheese (Basic Level) and Vat Pasteurization
(On-line lectures/2 days hands-on, 2 CEUs)

This workshop is designed for cheese manufacturers or others interested in the basic concepts of cheese making and is a required part of the Dairy Extension Basic Science of Cheese Certificate. The course may also be taken as a stand-alone training.

The course begins with an on-line lecture component covering the key areas related to vat pasteurization and basic cheese making techniques, cheese culture basics, milk defects, and cheese defects. The course will also include 2 days of hands-on pasteurization and cheese making activities.

Learning Outcomes

- Foodborne pathogens resulting from unpasteurized milk
- Components of vat pasteurization
- Thermometer requirements
- Chart recorders and chart requirements
- Milk quality which impacts cheese making
- Cheese culture and chemistry and microbiology
- Cheese-making unit operations and techniques and hands-on cheese making

The Science of Cheese (Advanced Level)
(2 day course, 2 CEUs)

This workshop is designed for advanced level cheese manufacturers or others interested in the advanced concepts of cheese and is a required part of the Dairy Extension Advanced Science of Cheese Certificate. The course may also be taken as a stand-alone training.

The workshop will provide attendees with a review of information in key areas related to the complex chemistry of cheese, cheese styles and standards of identity, advanced microbiology, advanced cheese problems and defects, and food safety challenges in the cheese industry. It is expected that the attendee has a variety of applied experience as this course is designed to test overall knowledge and problem-solving as it relates to cheese. This course assumes the attendee understands applied concepts and science as it relates to cheese before arrival.

Learning Outcomes

- Milk components and advanced chemistry of cheese
- Cheese styles and standards of identity
- Cheese defects during process and affinage

The Science of Yogurt and Fermented Dairy Products (Basic Level)
(On-line lectures/1.5 days hands-on, 2 CEUs)

This workshop is designed for yogurt and fermented dairy product manufacturers and is a required part of the Dairy Extension Basic Yogurt and Fermented Dairy Products Certificate. The course may also be taken as a stand-alone training.

The course begins with an on-line lecture component and is followed by hands-on sessions on-campus. The workshop will provide attendees with information in key areas related to milk quality and its impact on finished dairy products, product evaluation and defects, ingredients in cultured dairy products, and product processing and formulation.
Learning Outcomes
- Milk quality and impact on cultured dairy products
- Culture microbiology and hands-on cultured dairy making
- Unit operations and sanitation in cultured dairy production
- Formulation utilizing different ingredients

The Science of Yogurt and Fermented Dairy Products (Advanced Level)
(2 day course, 2 CEUs)
This workshop is designed for advanced level yogurt and fermented dairy product manufacturers and is a required part of the Dairy Extension Advanced Yogurt and Fermented Dairy Products Certificate. The course may also be taken as a stand-alone training.

The workshop will provide attendees with information in key areas related to advanced microbiology, chemistry in fermented milk and dairy product production, along with advanced sensory product evaluation, safety and quality assurance.

Learning Outcomes
- Milk components and advanced chemistry of cultured-dairy making
- Innovations in cultured dairy production
- Advanced sensory characteristics

Fluid Milk Processing/Testing for Quality and Safety Workshop
(2 day course, 2 CEUs)
This workshop is designed for those involved and/or interested in fluid milk processing and testing with the intent of providing the tools to support and improve on quality assurance/control and food safety programs for bottled milks. While the course design assumes participants have some prior knowledge of dairy microbiology & processing (e.g., Dairy Science & Sanitation Course), critical concepts will be reviewed and expanded on for those who do not. This course can be taken as a stand-alone.

Learning Outcomes
- Basic microbiology in relation to milk quality and safety
- Influence of raw milk quality on pasteurized milk quality and shelf-life
- Fluid milk processing parameters
- Tools for assessing milk quality and shelf-life

Food Safety Courses

Accredited HACCP Training Course
(2 day course)
This workshop is designed for individuals who have responsibility for building, maintaining, and updating plant HACCP programs that will meet customer and third party requirements. This course is accredited under the International HACCP Alliance and is designed to meet the requirements set for GFAI, NCIMS, FSIS, and the FDA.
Implementing SQF Systems Course
(1 day course)
This workshop is designed to give participants an understanding of the SQF Code; how to implement these requirements in a food processing plant, as well as food ingredient and food packaging plants to achieve or maintain SQF Certification. It is required that students have completed a HACCP Course of at least 16 hours prior to taking this course.

SQF Quality Management Systems for Food Manufacturing
(1 day course)
This one-day course is ideal for those already familiar with quality management principles, such as SQF quality practitioners or SQF Quality auditors, but who need to understand how to apply quality tools in the implementation of the SQF Quality Code. The course will address the impact of quality parameters on the site’s product and operation, assist sites in understanding how the SQF Quality Code aligns with food safety and allow learners to apply quality tools and techniques to implementation of the SQF Quality Code.
Candidates must have successfully completed a HACCP training course meeting the SQFI definition, and either Implementing SQF Systems training (minimum: edition 7), or Auditing SQF Systems/Lead SQF Auditor training (minimum: edition 7).
*Course description provided by Safe Quality Food Institute.

Artisan Dairy Food Safety Plan Coaching
(2 day course, 2 CEUs)
This coaching workshop is intended for Artisan Dairy Food Producers who are preparing to create, or are already developing, a FSMA compliant preventive control (PC)-based food safety plan for their facility. The goal of this workshop is to provide Food Safety Plan review and coaching sessions that guide attendees through each step in development process. PCQI lead trainers will be present to review topics and answer questions. Templates (digital and paper) will be provided to facilitate plan development, attendees are encouraged to bring their current or in-progress plans.
Note: This course is NOT intended to provide PCQI certification, it is strongly recommended that attendees complete an FSPCA PCQI certification course or similar program before attending this workshop. Attendees are also encouraged to enroll and complete the Food Safety for Artisan/Farmstead Cheesemakers prior to taking this workshop. The link to this online training will be provided upon registration.

Regulatory

FSMA Preventive Controls Qualified Individual Training
(2.5 day course, 2.5 CEUs)
The Current Good Manufacturing Practice, Hazard Analysis, and Risk-based Preventive Controls for Human Food regulation is intended to ensure safe manufacturing/processing, packing and holding of food products for human consumption in the United States. The regulation requires that certain activities must be completed by a preventive controls qualified individual who has successfully completed training in the development and application of risk-based preventive controls. This course developed by the FSPCA is the standardized curriculum recognized by FDA; successfully completing this course is one way to meet the requirements for a preventive controls qualified individual.
These courses are taught by Lead Instructors trained by the FSPCA, who have been instructed in how to teach the FDA-recognized standardized curriculum.
*Course description provided by the Food Safety Preventive Controls Alliance
Preventive Controls for Animal Food
(2.5 day course, 2.5 CEUs)

The Current Good Manufacturing Practice, Hazard Analysis, and Risk-based Preventive Controls for Animal Food regulation is intended to ensure safe manufacturing/processing, packing and holding of food products for animal consumption in the United States. The regulation requires that certain activities must be completed by a preventive controls qualified individual who has successfully completed training in the development and application of risk-based preventive controls, or is otherwise qualified through job experience to develop and apply a food safety system. This course developed by the FSPCA is the standardized curriculum recognized by FDA; successfully completing this course is one way to meet the requirements for a preventive controls qualified individual.

These courses are taught by Lead Instructors trained by the FSPCA and co-taught with Cooperative Feed Dealers, who have been instructed in how to teach the FDA-recognized standardized curriculum.

*Course description provided by the Food Safety Preventive Controls Alliance.

Dairy Processing Plant Superintendent (1 CEU)
Annual Update Provides dairy plant personnel with regulatory and extension updates. Offered at 4 locations each spring. Required update for all NY State Dairy Processing Plant Superintendents (PPS).

Dairy Laboratory Regional Workshops (1 CEU)
Provides dairy laboratory personnel with regulatory, procedural and scientific updates.

Certified Milk Inspectors Training School (2.5 CEUs)
Provides detailed instruction of required dairy farm inspections and is a required course for Certified Milk Inspectors (CMI), those who inspect dairy farms. Offered once each summer.

Certified Milk Inspectors Annual Update
Provides regulatory and extension updates on farm inspection & milk quality. Offered at 4 locations each fall. Required update for licensed Certified Milk Inspectors (CMIs).

New York State Fair Dairy Judging and Awards Program
Provides dairy plants the opportunity to receive awards and recognition for product quality at New York State Fair. Coordination and judging of dairy products for state fair competition occurs each summer at Cornell.

Specialty Training Programs
In addition to our Regulatory and Certificate program Training Courses, we also offer a selection of specialty courses in both food safety topics and advanced level hands-on training programs.

Dairy Basics
Four hour in-plant training in Milk Chemistry, Dairy Science, and Dairy Sanitation.
**Specialty Cheese Making**

This course is an advanced level hands-on course. Participants will apply scientific principles to craft four varieties of cheese from pasteurization through curing. In addition to making cheese, the course will also focus on milk quality, affinage, and sensory evaluation of cheese. It is recommended that participants have experience in cheese making. Enrollment is limited to the first 20 participants. Offered periodically.

**Pathogen Environmental Monitoring**

This course is will prepare participants to develop and implement an effective Pathogen Environmental Monitoring program that will achieve greater product safety and quality. The course will focus on pathogens of concern and the importance of environmental sampling programs. Potential sources of contamination will be identified and control steps outlined. Participants will work in small groups to develop an Environmental Monitoring Plan and discuss mitigation steps and corrective actions to control microbial contamination in a food processing facility.

Enrollment is limited to the first 40 participants. Offered periodically.

**Introduction to Artisan Ice Cream and Frozen Desserts**

This course is designed for the artisan ice cream manufacturer and will focus on types of frozen desserts, composition and physical properties, equipment, ingredients, sensory, as well as frozen dessert manufacture.

**Learning Outcomes**
- The composition of ice cream, and the origin of the ingredients within the food system.
- The physical and chemical changes that occur during ice cream production
- The equipment involved in making ice cream and product development
- The sensory properties of ice cream

**Accurate Labeling to Reduce Recall Risk**

This workshop is designed to provide participants with the necessary knowledge and skills to reduce the risk of product recalls and negative implications due to mislabeling.

Taught in partnership with Merieux NutriSciences.

**Introduction to Statistical Process Control**

Designed as an introductory course to discuss statistical methods and where they may be employed in a processing operation. The SQF Quality Code requires certified companies to be competent in SPC to reduce process variation and drive root cause analysis.

**Food Defense**

This workshop is designed to assist companies with the establishment of a food defense plan that will help them prevent, protect against, mitigate, and respond to an intentional adulteration incident.

**Improving Audit Outcomes**

This workshop is designed to give participants the tools on how to prepare and run their best GFSI audit. The training includes tips on how to set the stage for the audit, including prep time, record review and facility readiness. The workshop also includes investigation and follow-up on root cause analysis and corrective actions.
### Fees

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<th>Course</th>
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### Fees: Specialized Courses—Advanced

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<td><strong>Science of Cheese</strong></td>
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**Rates—Cornell Dairy Extension Services**

**Industry On-Site Workshops**

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<tr>
<td>Dairy Science &amp; Sanitation (2.5 days)</td>
<td>$12,500 plus travel/ accommodation for 2 instructors as needed—up to 30 attendees</td>
<td>$15,000 plus travel/ accommodation for 2 instructors as needed—up to 30 attendees</td>
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<td>Preventive Controls Qualified Individual (2–2.5 days)</td>
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<td>HACCP Training (2 days)</td>
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<td>GMPs Training (1 day)</td>
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<tr>
<td>Internal Audit Training (1 day)</td>
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<td>Workshop</td>
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<td>Food Defense Training (2 day)</td>
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<tr>
<td>Sanitary Transport Training (1 day)</td>
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<td>Foreign Supplier Verification Programs Training (1.5 days)</td>
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<td>$10,000 plus travel/accommodation for 2 instructors as needed—up to 30 attendees</td>
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Course Information

Good Manufacturing Practices
Part 117 Online Course
(12 weeks to complete)

This online course covers the requirements in the Code of Federal Regulations (CFR) Title 21, Part 117– Current Good Manufacturing Practice, Hazard Analysis, and Risk-Based Preventive Controls for Human Food. It addresses the revisions made to 21 CFR 110, as part of the Food Safety Modernization Act (FSMA).

Curriculum Overview

The course consists of 12 modules (listed below). Students have 12 weeks to review each module at their own pace. Each module concludes with a quiz, which students must complete to test their knowledge. After submitting all 12 quizzes, students will receive a Certificate of Course Completion issued by the Institute for Food Safety at Cornell University (IFS@CU).

- Module 1: GMP Regulation & Training
- Module 2: Food Safety: Microbes & Allergens
- Module 3: Personnel: Health & Hygiene
- Module 4: Plant Grounds & Pest Control
- Module 5: Plant Construction & Design
- Module 6: Sanitary Facilities: Water, Plumbing & Toilets
- Module 7: Sanitary Operations: Cleaning & Sanitizing
- Module 8: Equipment & Utensils
- Module 9: Plant Operations & Raw Materials
- Module 10: Manufacturing Operations: Process Controls
- Module 11: Warehousing, Food Disposition & Defects
- Module 12: Building Sanitation Procedures

Meet the Team

Elizabeth Bihn, Ph.D.
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Institute for Food Safety at Cornell University
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Elizabeth Demmings, Ph.D.
Program Coordinator
Institute for Food Safety at Cornell University
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Nancy Long
Administrative Assistant
Institute for Food Safety at Cornell University
E-mail: NPL1@cornell.edu

Nicholas Luongo
Web Designer
Institute for Food Safety at Cornell University
E-mail: ndl32@cornell.edu

Who should take this course?

This course is intended for supervisors, middle level managers, quality control personnel, and those responsible for ensuring that food processing, wholesale and warehouse operations, or other facilities, meet current GMP requirements.
Course Registration
The Institute for Food Safety at Cornell University (IFS@CU) is hosting and managing the new GMPs Part 117 Online Course. The IFS@CU takes a comprehensive approach to provide training and conduct research to support the food industry, from farm to fork, in reducing foodborne illness risks. The course fee is $200, which is payable by credit card or check. Group discounts are available for groups with 20 or more participants.

Register for the course at: instituteforfoodsafety.cornell.edu/trainings. Please direct inquiries about the course to ifstraining@cornell.edu.

Calendar

<table>
<thead>
<tr>
<th>Topic</th>
<th>Date Offered</th>
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<tr>
<td>GMPs Part 117</td>
<td>Rolling admission</td>
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The Institute for Food Safety at Cornell University (IFS@CU) is unique in its comprehensive approach for addressing current and emerging food safety issues. Harnessing Cornell’s existing strengths across food production systems, the IFS@CU integrates extension, training, and research to prevent foodborne illnesses in innovative and pioneering ways, optimizing product quality and safety from farm-to-table.

As the pre-eminent source of food safety information, the IFS@CU provides training and support to help growers and processors overcome food safety challenges such as complying with regulatory requirements in the U.S. Food and Drug Administration’s Food Safety Modernization Act (FSMA). Located at the College of Agriculture and Life Sciences’ Cornell AgriTech in Geneva, New York, the IFS@CU brings together diverse collaborators from across the fields of food science, horticulture, plant pathology, and entomology, as well as business development expertise from entrepreneurs at the Cornell Agriculture and Food Technology Park. This collaborative network supports the food production industry to stimulate economic growth and create new market opportunities for the Empire State’s farmers, food processors, retailers, and food entrepreneurs. For additional information please visit our website: instituteforfoodsafety.cornell.edu.

Meet the Team

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Director, National GAPs Program  
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**Dr. Elizabeth Demmings**  
Program Coordinator  
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**Nancy Long**  
Administrative Assistant  
E-mail: NPL1@cornell.edu

**Laura Pineda-Bermúdez**  
E-mail: lp384@cornell.edu
Steering Committee

Dr. Carmen Moraru
Professor, Food Science Department

Ms. Julie Suarez
Associate Dean, CALS

Dr. Jan Nyrop
Goichman Family Director, NYSAES
Director, CUAES
Associate Dean, CALS

Dr. Christopher Watkins
Director, CCE
Associate Dean, CALS and Human Ecology

Dr. Martin Wiedmann
Gellert Family Professor in Food Safety, Food Science Department
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Dr. Randy Worobo
Professor, Food Science Department
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Services Provided by IFS@CU Collaborating Programs

Process Authority by CFVC
Dairy Process Authority by Dairy Foods Extension
HPP Validation Center

Contact the IFS@CU
E-mail us: foodsafety@cornell.edu
Visit our website: instituteforfoodsafety.cornell.edu
Juice Safety

Course Information

Juice HACCP Certification Course

(1.5 day course, 2 CEUs)

Under the federal Juice HACCP rule published in 2001, juice processors must comply with two requirements: (1) Subpart A of the rule requires use of HACCP principles and systems in their operations. (2) Subpart B of the rule requires that processors implement treatment(s) to reduce a theoretical population of “pertinent” microorganisms in the juice by 99,999% or 5-log cycles. The “pertinent” microorganism is defined as the most resistant microorganism of public health significance that is likely to occur in the juice.

Juice processors that meet the definition of “retail” establishments are not covered by the federal juice HACCP regulation but must comply with other federal and state rules that regulate juice production. Retail establishments are manufacturers that prepare and provide all of their juice production directly to consumers and do not sell or distribute (wholesale) juice to other businesses.

Juice HACCP commonly refers to the use of HACCP plans to minimize food safety risks in the juice processing, packaging, and transportation industries. HACCP stands for Hazard Analysis Critical Control Point. Significant hazards for a particular juice, puree, or concentrate are identified, based upon scientific information. The steps at which these hazards can be controlled within the process are identified, and the critical limits at each of the key process steps are set. Monitoring procedures are implemented to evaluate conformance with these critical limits. The HACCP plan relies on extensive verification and documentation to assure that food safety has not been compromised. Thus, HACCP provides a structure for assessing risks or what could go wrong, and for putting the controls in place to minimize such risks.

Juice HACCP Certification Course includes:

- Introduction to Food Safety and the HACCP System
- The Regulation
- Hazards
- Prerequisites to HACCP
- Commercial Processing Example
- Hazard Analysis & Preventative Measures (Principle 1)
- Identification of Critical Control Points (Principle 2)
- Establishment of Critical Limits (Principle 3)
- Critical Control Point Monitoring (Principle 4)

Juice HACCP Certification Course includes (cont.):

- Corrective Actions (Principle 5)
- Verification (Principle 6)
- Record Keeping Procedures (Principle 7)
- Sources of Info

Meet the Team

Randy Worobo
Professor, Institute for Food Safety
E-mail: rww8@cornell.edu
Areas of Expertise: Food safety; food microbiology; fruit and vegetable safety.
<table>
<thead>
<tr>
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**Course Information**

**Cured Meats Processing Workshop**  
*(2 Days Hands-On, 2 CEUs)*

The Cured Meats Processing Workshop is designed for small scale processors, restaurants, and butchers who would like to develop or increase their value-added section meat sales. Participants will learn the basics of curing meats, meat science, and non-meat ingredients. Lectures will include food safety, meat mathematics, thermal processing, and instrumentation. The course consists of two days of lectures and processing of cured meats.

**Learning Outcomes**
- Generate meat products based on knowledge acquired in course
- Apply food safety principles to creation of value-added meat products
- Discussion of meat science, meat mathematics, and instrumentation

**Hazard Analysis Critical Control Point Programs for Meat and Poultry Processors (HACCP)**  
*(2 Days Lecture and Hands-On, 2 CEUs)*

This course covers the fundamentals of HACCP (Hazard Analysis Critical Control Point) and the application in meat and poultry processing operations. This course is certified by the International HACCP Alliance and meets USDA requirements for HACCP training. Training is a collaboration between Cornell Dairy Foods Extension and Penn State Extension. This training is intended for: plant managers, HACCP coordinators, quality assurance/control personnel, sanitation management, line supervisors, line operators employed by meat and poultry processing plants, and professionals looking to increase their knowledge of HACCP.

**Learning Outcomes**
- Hazards associated with meat foods
- Prerequisite programs and GMPs

**Calendar**

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Meet the Team

**Jonathan Campbell**  
*Assistant Professor of Animal Science and Extension Meat Specialist*

E-mail: meatscience@psu.edu  
Phone: (814) 867–2880

**Louise M. Felker**  
*Program Coordinator*

Phone: (607) 255–7098  
E-mail: lmf226@cornell.edu

**Areas of Expertise:** Areas of expertise include: HACCP, FSMA, Processed Meat Food Safety, Salumi Production, Process Validation.

Areas of Expertise: Workshop/short course organization and planning, food safety systems, good manufacturing practices, social media/web development.
**Produce Safety Alliance**

The Produce Safety Alliance (PSA) was created to help fresh produce growers meet the regulatory requirements included in the Food Safety Modernization Act (FSMA) Produce Safety Rule. It was established through a cooperative agreement between Cornell University, the United States Food and Drug Administration (FDA), and the United States Department of Agriculture (USDA). The PSA has developed two types of training courses; the PSA Grower Training Course and the PSA Train-the-Trainer Course. The PSA began offering both courses in September 2016 and has trained close to 30,000 produce growers and over 2,200 trainers in the United States and internationally.

**Meet the Team**

**Elizabeth Bihn, Ph.D.**  
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**Gretchen Wall, M.S.**  
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PSA Southeast Regional Extension Associate  
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**Michele Humiston**  
PSA Extension Support Specialist  
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**Robert Way**  
PSA Communication Specialist  
Based in Geneva, New York  
Phone: (315) 787–2249  
E-mail: rfw2@cornell.edu
The PSA Grower Training Course was created through a five-year nationwide curriculum development process. In 2011, after hosting an international gathering to review current Good Agricultural Practices (GAPs) educational resources, the PSA launched ten open Working Committees (WCs), composed of one hundred seventy-eight members from academia, the grower community, the produce industry, and regulatory agencies. The WCs identified key priority areas and learning objectives to be addressed in the grower curriculum. Additionally, grower preferences regarding produce safety training programs were collected through eight farmer focus groups nationwide, collecting feedback from eighty-nine fruit and vegetable growers. Beginning in the fall of 2015, the PSA engaged with the FDA Division of Produce Safety staff to align the seven module PSA Grower Training Course with the final FSMA Produce Safety Rule requirements, incorporating the regulatory language throughout the curriculum modules and teaching notes.

The PSA Train-the-Trainer Course has been designed to prepare educators to deliver the PSA Grower Training Course to produce growers and become PSA Trainers or PSA Lead Trainers. During the two-day PSA Train-the-Trainer Course, attendees will have the opportunity to experience all seven PSA Grower Training Course modules, and learn more about conducting effective trainings for growers.
a review of the PSA Grower Training curriculum. The course will also cover principles of adult education, how to incorporate the PSA curriculum into extension trainings, how to develop working partnerships, expectations for trainers, how to become a PSA Lead Trainer, and how to register a PSA Grower Training Course with the Association of Food and Drug Officials (AFDO).

**Trainer Prerequisite Knowledge**

Individuals who want to become PSA Trainers or PSA Lead Trainers are expected to have basic knowledge in four competency areas including:

- Produce safety scientific knowledge and experience
- Fruit and vegetable production knowledge
- Effective training delivery
- Knowledge of the FSMA Produce Safety Rule

After attending the course, participants will be eligible to receive a certificate from the Association of Food and Drug Officials (AFDO) that verifies they have completed the PSA Train-the-Trainer course. Completing this training allows participants to deliver the PSA Grower Training curriculum under the direction of a PSA Lead Trainer. Any participant who has completed this training may also apply to become a PSA Lead Trainer. More detailed information about becoming a PSA Trainer or PSA Lead Trainer is available on the PSA website.

**Learning Outcomes**

- Understand microorganisms relevant to produce safety and where they may be found on the farm environment
- Identify microbial risks and potential routes of contamination, practices that reduce risks, and how to begin implementing produce safety practices on the farm
- Become familiar with the PSA Grower Training curriculum and resources
- Understand FSMA Produce Safety Rule requirements and their impact to fruit and vegetable growers
- Develop the skills necessary to deliver an effective PSA Grower Training to produce growers, packers, shippers, regulatory personnel, and others

For additional information about the PSA Train-the-Trainer Course and scheduled courses, please visit the PSA website and look for upcoming Train-the-Trainer courses under the Training tab.

**Good Agricultural Practices (GAPs) Course Information**

**Multi-Day Good Agricultural Practices (GAPs) Training Course**

*(2–3 Days)*

This two-day course provides a solid foundation of Good Agricultural Practices (GAPs) knowledge, time to support produce safety discussions, and opportunities for hands-on activities, including the development of a written Farm Food Safety Plan. Offered in collaboration with colleagues from Cornell Cooperative Extension’s Regional Teams, this course includes the PSA Grower Training curriculum, which satisfies the Food Safety Modernization Act (FSMA) Produce Safety Rule.
requirement outlined in § 112.22(c) that requires ‘At least one supervisor or responsible party for your farm must have successfully completed food safety training at least equivalent to that received under standardized curriculum recognized as adequate by the Food and Drug Administration.’

The course is intended to improve grower’s understanding of GAPs and the FSMA Produce Safety Rule to guide the assessment of microbial risks and implementation of practices to reduce risks on fresh produce farms. On the second day of training, knowledge gained on Day 1 is utilized to write their own Farm Food Safety Plan by using templates and sample recordkeeping logs. A third optional day may be offered that includes a mock third-party audit hosted on one of the training participant’s farm. The mock third-party audit is conducted during the growing season so that participants can learn about the audit protocol and see produce safety practices in action.

After attending the course, participants will be eligible to receive a certificate from the Association of Food and Drug Officials (AFDO) that verifies they have completed the PSA Grower Training course.

Learning Outcomes
- Understand microorganisms relevant to produce safety and where they may be found in the farm environment
- Identify microbial risks and potential routes of contamination, practices that reduce risks, and how to begin implementing produce safety practices on the farm
- Understand FSMA Produce Safety Rule requirements
- Begin writing a Farm Food Safety Plan and develop written SOPs, recordkeeping logs, and produce safety policies for your farm
- Understand third-party audits for produce safety

For additional information about Multi-Day Good Agricultural Practices (GAPs) Trainings in New York, visit the National Good Agricultural Practices Program website at: gaps.cornell.edu/person-gaps-trainings

Good Agricultural Practices (GAPs)
Online Produce Safety Course
(Web-based, 3-weeks, self-paced)

The GAPs Online Produce Safety Course is a 3-week web-based course offered through the National GAPs Program. This course is intended to improve your understanding of GAPs to guide assessment of risks and implementation of practices to reduce risks on fresh produce farms. Taking this course will not result in your farm being “GAPs Certified”. GAPs certification is done by a third-party (e.g. USDA, Primus, Global GAP) and involves the successful completion of an on-farm audit. This course does not include information about the Food Safety Modernization Acts (FSMA) Produce Safety Rule.

Time Commitment
Most students spend 15 to 20 hours on this course, but depending on your knowledge, more or less time may be required. Once
the course opens, it is open 7 days a week, 24 hours a day for 3 weeks so you will be able to complete the course when time permits in your schedule. There are no required hours of participation. There is an instructor and the instructor may schedule office hours, but you are not required to attend these hours. You will be able to e-mail your instructor at all times during the course and they will respond in a timely manner. All course requirements must be completed within the 3 week window. Within the three weeks you are expected to:

- Complete a pre and post test
- Read all course materials
- Turn in 4 assignments for evaluation
- Complete 2 self-tests
- Contribute to the discussion boards.
- Complete a Course Evaluation

**Course Scheduling and Class Size**
Courses run several times throughout the year. Please check the website for a current list of course offerings. Class size is limited to 25 people on a first come, first serve basis. A minimum of 10 participants must be registered for us to offer the course. Special arrangements can be made for large groups to ensure everyone is in the same class together.

**Special Note**
As you consider taking the GAPs Online Produce Safety Training Course, be aware that this course is not currently equivalent to the required supervisor training described in the FSMA Produce Safety Rule 21 CFR Subpart C § 112.22(c). This GAPs Online Produce Safety Training Course may, however, satisfy training requirements as described in the FSMA Produce Safety Rule in §§ 112.21(a) and (b).

For additional information about the GAPs Online Produce Safety Course and scheduling classes, visit the National Good Agricultural Practices website at: [gaps.cornell.edu/gaps-online-course](gaps.cornell.edu/gaps-online-course)
About the Program

The Seafood HACCP Course offered through NY Sea Grant and Cornell University was developed through the Seafood HACCP Alliance and is recognized by the US Food and Drug Administrations (FDA) to meet the training requirements established under the FDA’s mandatory seafood HACCP regulation (21 CFR Part 123). This regulation requires that the following HACCP activities be conducted by a “trained individual”.

- Developing a HACCP plan
- Annual reassessment of the HACCP plan
- Modifying the HACCP plan
- Performing a review of HACCP records

Course Information

The course provides training for the seafood industry and regulatory agencies on the fundamentals of HACCP, the current Seafood HACCP regulation, introduction to guidance and training materials and the development of a HACCP plan for seafood products. There are two options for completing the Seafood HACCP Course: the Segmented Course, or the Basic Course: (3 consecutive days).

Segmented Course

Segment 1:
Is an online course that can be taken at your own pace and on average takes 8–10 hours to complete. You will have 6 months from time of enrollment to complete. The Segment 1 online Seafood HACCP course is ongoing and one can register online at any time.
http://seafoodhaccp.cornell.edu/Intro/index.html

*Course is administered manually and enrollment/completions are processed Monday-Friday between 9am and 4pm excluding holidays.

Meet the Team

Michael Ciaramella, MSc, PhD
Seafood Safety and Technology Specialist
New York Sea Grant, Cornell Cooperative Extension
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E-mail: mc2544@cornell.edu
Web: www.nyseagrant.org/seafood
Areas of Expertise: Seafood Safety (HACCP), nutrition, quality and processing, Good Manufacturing Practices, Aquaculture and Physiology.
**Segment 2:**
The Segment 2 in person course is will be offered at least twice a year (Spring and Fall) Dates will vary depending on room availability and location.

NOTE: Additional courses can be scheduled as needed. Basic and segment 2 courses are typically offered in Jamaica, NY. If the need exists, the course can be offered throughout the state but pricing will vary depending on location. Contact the instructor to inquire about additional courses. The segment 2 runs from 9:00 am – 4:30 pm

**Learning outcomes:**
- General understanding of HACCP Fundamentals and seafood safety concerns/hazards
- Understanding of FDA’s current seafood HACCP regulation
- Utilize training and guidance materials available to develop a HACCP plan

**Basic Course**
The basic 3 day HACCP course is offered as needed. Dates will vary depending on need. Scheduled basic courses will be listed on the NY Sea Grant website (www.nyseagrant.org/seafood). If courses do not appear contact the instructor for more information and to request a basic Seafood HACCP course.

**Cost**
- Basic Course: $200.00+ (price will vary based on size and location, contact instructor for more info)
- Segment 1 (E-course): $75.00
- Segment 2 (in-person): $100.00 (Jamaica Location)

**Cost**

**Training materials for the course will cost an additional $35.00–$70.00.**

**Calendar**

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<tr>
<th>Topic</th>
<th>Date Offered</th>
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<td>Seafood HACCP Segment 2</td>
<td>4/9/19</td>
<td>Jamaica, NY</td>
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<tr>
<td>Seafood HACCP Segment 2</td>
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<td>Jamaica, NY</td>
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