FNH 403-Food Laws, Regulations and Quality Assurance Syllabus

Course Details

Course	FNH 403
Prerequisites	One of LFS 252, STAT 200, FRST 231, BIOL 300 (or equivalent background in statistics).
Term/Year	Winter Term 2 (January 6, 2025, to April 8, 2025)
Class Day/Time/Location	**Lectures:** Monday, Wednesday, and Friday 11:00 am-11:50 am, CHBE-Floor 1-Room 102
Tutorials:	**D03:** Wednesday 9:00 am-9:50 am, BIOL 1012
	D04: Wednesday 11:00 am-11:50 am, BIOL 1012
	Note: Classes will be recorded and posted to Canvas. Tutorial attendance is mandatory. Attendance will be taken.
Instructor	Nancy Ross
Email	nancy.ross@ubc.ca (Please contact via Canvas)
Office	FNH 322
Office Hours	Friday 9:30 am – 10:45 am (PDT). Virtual hours available as needed.
TAs	Kaitlyn Lumby, Peter Yang
TA Contact	Contact via Canvas

Course Objectives

Various quality management systems available to the food scientist/food technologist are covered. The course begins with an overall view of a quality management philosophy ascribed by Total quality management (TQM). QC techniques using Statistical Quality Control (SQC) are examined. Canadian food law and regulations are then outlined as an introduction to Good Manufacturing Practices (GMPs), Codex Alimentarius, and HACCP. The tutorial sessions Wednesday morning will be used for lectures or group work throughout the course.

Learning Outcomes

At the end of this course students will be able to:

- Explain current quality management theories and demonstrate their effectiveness and application in food manufacturing (e.g. Implementation of a HACCP program)
- Describe how the application of quality management theory and statistical process control (SPC) can be used to continually improve manufacturing processes
- Be able to collect data in a food processing plant and construct check sheets and control charts appropriate for any production process
- Describe the Canadian and international agencies that establish regulations and standards and explain their interdependencies.
- Enhance decision-making skills and develop an ability to apply analytical tools in true-to- life situations through preparing solutions to different case studies.
- Develop a food safety plan following HACCP principle.

Institute of Food Technologists (IFT)

UBC's Food Science Program is one of few in Canada that are approved by the Institute of Food Technologists (IFT), an internationally recognized leader in undergraduate education standards for degrees in Food Science. Programs with this approval badge are recognized as delivering a comprehensive Food Science education that covers 55 essential learning outcomes (ELOs) established by the IFT organization. For further information on IFT ELOs, click here. The highlighted ELOs below are covered in this course.

Institute of Food Technologists Essential Learning Objectives (IFT ELOs)

The IFT ELOs that are highlighted below are covered in this course

Food chemistry (FC)
FC.1. Discuss the major chemical reactions that limit shelf life of foods.
FC.2. Explain the chemistry underlying the properties and reactions of various food components.
FC.3. Apply food chemistry principles used to control reactions in foods.
FC.4. Demonstrate laboratory techniques common to basic and applied food chemistry. FC.5. Demonstrate practical proficiency in a food analysis laboratory.
FC.6. Explain the principles behind analytical techniques associated with food.
FC.7. Evaluate the appropriate analytical technique when presented with a practical problem.
FC.8. Design an appropriate analytical approach to solve a practical problem.

Food microbiology (FM)
FM.1. Identify relevant beneficial, pathogenic, and spoilage microorganisms in foods and the conditions under which they grow.
FM.2. Describe the conditions under which relevant pathogens are destroyed or controlled in foods.
FM.3. Apply laboratory techniques to identify microorganisms in foods.
FM.4. Explain the principles involved in food preservation via fermentation processes.
FM.5. Discuss the role and significance of adaptation and environmental factors (e.g., water activity, pH, temperature) on growth response and inactivation of microorganisms in various environments.
FM.6. Choose relevant laboratory techniques to identify microorganisms in foods.

Food safety (FS)
FS.1. Identify potential hazards and food safety issues in specific foods.
FS.2. Describe routes of physical, chemical, and biological contamination of foods.
FS.3. Discuss methods for controlling physical, chemical and biological hazards.
FS.4. Evaluate the conditions, including sanitation practices, under which relevant pathogenic microorganisms are commonly controlled in foods.
FS.5. Select appropriate environmental sampling techniques.
FS.6. Design a food safety plan for the manufacture of a specific food.

Food engineering and processing (FE)
FE.1. Define principles of food engineering (mass and heat transfer, fluid flow, thermodynamics).
FE.2. Formulate mass and energy balances for a given food manufacturing process.
FE.3. Explain the source and variability of raw food materials and their impact on food processing operations.
FE.4. Design processing methods that make safe, high-quality foods.
FE.5. Use unit operations to produce a given food product in a laboratory or pilot plant. FE.6. Explain the effects of preservation and processing methods on product quality.
FE.7. List properties and uses of various packaging materials and methods.
FE.8. Describe principles and practices of cleaning and sanitation in food processing facilities.
FE.9. Define principles and methods of water and waste management.

Sensory science (SS)
SS.1. Discuss the physiological and psychological basis for sensory evaluation.
SS.2. Apply experimental designs and statistical methods to sensory studies.
SS.3. Select sensory methodologies to solve specific problems in food.

Quality assurance (QA)
QA.1. Define food quality and food safety terms.

QA.2. Apply principles of quality assurance and control.
QA.3. Develop standards and specifications for a given food product.
QA.4. Evaluate food quality assessment systems (e.g. statistical process control).

Food laws and regulations (FL)
FL.1. Recall government regulatory frameworks required for the manufacture and sale of food products.
FL.2. Describe the processes involved in formulating food policy.
FL.3. Locate sources of food laws and regulations.
FL.4. Examine issues related to food laws and regulations.

Data and statistical analysis (DS)
DS.1. Use statistical principles in food science applications.
DS.2. Employ appropriate data collection and analysis technologies.
DS.3. Construct visual representation of data.

Critical thinking and problem solving (CT)
CT.1. Locate evidence-based scientific information resources.
CT.2. Apply critical thinking skills to solve problems.
CT.3. Apply principles of food science in practical, real-world situations and problems.
CT.4. Select appropriate analytical techniques when presented with a practical problem.
CT.5. Evaluate scientific information.

Food science communication (CM)
CM.1. Write relevant technical documents.
CM.2. Create oral presentations.
CM.3. Assemble food science information for a variety of audiences.

Professionalism and leadership (PL)
PL.1. Demonstrate the ability to work independently and in teams.
PL.2. Discriminate tasks to achieve a given outcome.
PL.3. Describe social and cultural competence relative to diversity and inclusion.
PL.4. Discuss examples of ethical issues in food science

Course Format

The concepts in this course will be introduced to you the student through a combination of lecture and group activities. Group assignments, which for the most part are based on case studies, will be used to illustrate the applicability in an industrial setting of the theories and philosophies introduced in the lectures. Cases studies have proved to bring interesting real-world situations into the classroom. You will discover that decision making often is a confrontational activity involving people with different points of view. By working through the case studies, you will learn how to work toward consensus while tolerating legitimate difference of opinion and it will prepare you for great challenges in your future (or current) job.

Learning Activities

Participation is mandatory in tutorial sessions and attendance will be taken. In class we will use polling features. Please read tutorial assignments before coming to class so we can use time effectively.

Selected Bibliography

1. Kramer, A., and Twigg, B (1970). Fundamentals of Quality Control for the Food Industry, 3rd Edition. (Westport, Connecticut, AVI Publishing, 1970)
2. Besterfield, D. Quality Control (Upper Saddle River, New Jersey, Pearson, Prentice Hall, 2004)
3. Tague, N. The Quality Toolbox, 2nd Edition. (Milwaukee, Wisconsin; ASQ Quality Press, 2005)
4. Mortimore S. and Wallace C. 2013. "HACCP: A Practical Approach," 3rd ed. Springer, New York.
5. Mortimore S. and Wallace C. 2015. "HACCP: A Food Industry Briefing," 2nd ed. Wiley Blackwell, UK.
6. Surak, J and Wilson, S The certified HACCP auditor. (Milwaukee, Wisconsin; ASQ Quality Press, 2007)

Learning Resources

UBC Library has a series of undergraduate user guides to support your learning. For the upcoming terms, their Online Learning video tutorial and UBC's Keep Learning website are helpful resources.

Course Schedule

The canvas course template is used as the schedule. There is a link for each week on the Front Page of Canvas that provides readings, PowerPoint and the dates assignments and quizzes are due. The due dates of quizzes and assignments are available in the right margin of Canvas pages.

Course Modules

Section 1: Quality

- Define quality
- Discuss consumers' expectations of quality
- List dimensions of quality
- Define Quality Control (QC) and Quality Assurance (QA)
- Recall responsibilities and functions of QC and QA
- Discuss history of QC and QA in (food) manufacturing
- Define Total Quality Management (TQM)
- Discuss the history of TQM
- Assess TQM's role in current Quality Management practices
    - Describe the 6 basic principles of TQM
    - Discuss Deming's work
    - List Deming's 14 Points
        - Give examples of Internal and External Customers
    - Describe Deming's Plan-Do-Check-Act (PDCA) cycle

Section 2a: Regulations

- Discuss current regulatory changes affecting the food industry in Canada
- Explain the purpose (benefits) of the Canadian Food Inspection Agency (CFIA)
- Discuss the history of the formation of the CFIA
- Paraphrase the mission and objectives of the CFIA
- Outline the organizational structure and responsibilities of the Ministry of Health and the Ministry of Agriculture
- Outline the responsibilities of various Federal and Provincial regulatory bodies
- Compare and contrast Acts and Regulations and how they are created
- Recognize the Acts and Regulations repealed with the Safe Food for Canadian Act
- Use Documents Incorporated by Reference
- Define "licensed establishment"
- Define "standardized product"

Section 2b: Labelling

- State the purpose of a food label
- List mandatory information on food labels
- Determine the principal display panel (PDP) and available display surface (ADS)
- Use internet resources (e.g., www.inspection.gc.ca, Industry Labelling Tool) to prepare a food product label
- Prepare a food product label using the new Canadian format (compliance required by December 2022 due to COVID extension)
- Differentiate terms in the Food and Drug Regulations, Consumer Packaging Labelling Regulations, and Safe Food for Canadian Regulations, including:
    - Reference Amount
    - Serving Size

    - Household Measure (HM)
    - Metric Measure (MM)
    - Daily Value (% Daily Value)
- List core nutrients on the Nutrition Facts table
- Use the Industry Labelling Tool to determine serving sizes and format core nutrient information
- Use the Compendium of Templates for Nutrition Facts Tables and List of Ingredients to select a format
- Give examples of different nutrient content and health claims
- List/Identify inappropriate claims on food labels

Final Exam Includes Sections 3 and 4 Only

Section 3: HACCP

- Use Codex HACCP documents
- List the 7 Prerequisite Programs
- Describe the elements in each Prerequisite Program
- Describe how Prerequisite Programs are used to control identified hazards
- Compare and contrast Prerequisite Programs and Good Manufacturing Practices (GMP)
- Define "Hazard"
- List three types of hazards in food production
- Use hazard descriptions and “due to” statements to describe food processing hazards
- State the 7 principles of HACCP and explain their role in the 12 steps of implementation
- Prepare Basic Product Information
- Transfer input materials and process steps to a Hazard Analysis form
- Complete Hazard Analysis and justify it
- Justify Critical Control Point (CCP) determination
- Develop Critical Limits for a CCP
- Demonstrate how appropriate hazard analysis reduces the risk of a food safety hazard
- Support CCP selection in a food process
- Establish Monitoring, Deviation, and Verification procedures for each CCP
- Establish record-keeping for the HACCP Plan
- Prepare a Standard Operating Procedure (SOP)
- Compare and contrast types of Product Recovery
- Identify the 3 classes of Recall and give examples of each type
- Describe the role of CFIA in recall actions
- Outline information required by CFIA
- List members of the Recall team
- Describe the action steps of the Recall plan
- Discuss reasons for performing a mock recall as part of the Recall Prerequisite Program

Section 4: 7 Quality Tools and Statistical Process Control (SPC)

- Summarize tools that identify issues
- Recognize tools that analyze problems
- Use quality tools to solve problems
- Analyze scenarios and determine correct applications for each quality tool
- Evaluate a situation and decide which quality tools are most appropriate
- List reasons to use Control Charts
- Describe the purpose of Control Charts
- Define symbols used in control charts
- Compare and contrast variable and attribute control charts
- Construct X-bar and R-charts
- Interpret X-bar and R-charts
- Design a variable control chart
- Use out-of-control rules to detect attributable (special) causes

Course Assessment

Examinations: There is no midterm in this course. The final exam will be held in person during the UBC exam schedule. The final exam covers Section #3 (HACCP) and Section # 4 (7 Quality Tools and Statistical Process Control (SPC) only.

See "RUBRICS" Document

Final Exam Format

- The final exam covers Section #3 (HACCP) and Section # 4 (7 Quality Tools and Statistical Process Control (SPC) only.
- Turn Learning Outcomes around and think of them as questions.
- About 10 multiple choice questions on prerequisite programs, HACCP principles, quality tools.
- 2-3 short answer questions as demonstrated in example questions. i.e. define CCP and then **a** part **b** part, testing of knowledge of the concept in part **a**. Topics include preventive control (prerequisite programs) recall programs, HACCP 12 steps and 10 forms, 7 principles.
- 1 Form 10 CCP Determination table (case study).
- 1 Control Chart exercise – create control chart and suggest reasons why process is not in control.

Academic integrity

The academic enterprise is founded on honesty, civility, and integrity. All UBC students are expected to behave as honest and responsible members of an academic community. At the most basic level, this means submitting only original work done by you and acknowledging all sources of information or ideas and attributing them to others as required. This also means you should not cheat, copy, or mislead others about what is your work. Cheating and plagiarism (including both presenting the work of others as your own and self-plagiarism), are serious academic offences that are taken very seriously in Land & Food Systems. By registering for courses at UBC, students have initiated a contract with the university that they will abide by the rules of the institution. It is the student's responsibility to inform themselves of the University regulations.

The UBC library has a useful Academic Integrity website that explains what plagiarism is and how to avoid it. If a student is in any doubt as to the standard of academic honesty in a particular course or assignment, then the student must consult with the instructor as soon as possible. A more detailed description of academic integrity, including the University's policies and procedures, may be found in the Academic Calendar. All course work is required to be submitted to Turnitin.com for review.
It is the student's obligation to learn, understand and follow the standards for academic honesty. Students must be aware that standards at the University of British Columbia may be different from those in secondary schools or at other institutions.

Violations of academic integrity lead to the breakdown of the academic enterprise, and therefore serious actions are taken. Plagiarism or cheating may result in a mark of zero on an assignment, exam, or course. More serious consequences may apply if the matter is referred to the President's Advisory Committee on Student Discipline. Academic misconduct may result in a one- year suspension from the University and a notation of academic discipline on the student's record.

University Policies

UBC provides resources to support student learning and to maintain healthy lifestyles but recognizes that sometimes crises arise and so there are additional resources to access including those for survivors of sexual violence. UBC values respect for the person and ideas of all members of the academic community. Harassment and discrimination are not tolerated nor is suppression of academic freedom. UBC provides appropriate accommodation for students with disabilities and for religious observances. UBC values academic honesty and students are expected to acknowledge the ideas generated by others and to uphold the highest academic standards in all of their actions.
Details of the policies and how to access support are available on **the UBC Senate website**.

FNH 403 Food Law, Regulations and Quality Assurance Grading Rubric					
Section	Possible Marks	Excellent	Good	Needs Improvement	Unacceptable
Section 1 Introduction to Quality					
Introduction to Group Processing	Group participation activity	First group activity of semester. Groups will receive a food product and work together to complete the Group Processing worksheet (Product description, manufacturing process, quality and safety attributes, labelling).			
History of Quality	6	Quality Guru reading quiz			
Quality Terms	10	Match the quality term and definition			
Total Quality Management (TQM)	Group Participation Activity	Groups use TQM concepts and identify internal and external customers in businesses.			
Section 2 Regulations					
Canvas Quiz 1 Regulations Search	16	Suggested reference demonstrates good use of government websites to find regulation to answer typical food industry questions. Uses correct format to reference a regulation (eg. B.08.008) Submits quiz prior to due date	Answers to questions appear to be a google search. Incorrect format Submits quiz prior to due date	Answers to questions appear to be a google search. Completes quiz and does not submit.	Quiz not submitted by deadline and student requests that the quiz be re- released.
Canvas Quiz 2 Regulations Search	10	Summary questions on labelling rules. Submits quiz prior to due date	Incomplete answers	Answers to questions appear to be a google search. Completes quiz and does not submit.	Quiz not submitted by deadline and student requests that the quiz be re-released.
ADS assignment	9	Calculation done correctly. Shows units	Answer without explanations		Assignment not submitted by deadline
Assignment Prepare Label Information for food product.	32	Determine format of NFt. Select correct serving size for product from regulations. (Table of Reference Amounts) Calculate nutrient content using serving size and laboratory analysis of product (13 components)	Incorrect serving size Nutrient content calculation done correctly but answer is not correct because	Incorrect serving size Incorrect application of nutrient rounding rules Completes quiz and does not submit.	Assignment not submitted by deadline

FNH 403 Food Law, Regulations and Quality Assurance Grading Rubric					
Section	Possible Marks	Excellent	Good	Needs Improvement	Unacceptable
		Apply rounding rules correctly to nutrients Determine eligible claims	incorrect serving size was used Apply rounding rules correctly to nutrients Incorrectly interpret claim regulations	No review of claims	
Section 3 – Hazard Analysis and Critical Control Point (HACCP)					
Basic Product Information					
Forms 1- 3 Food Product with CCP	Preparation of HACCP Forms (25 marks)	**Basic product information** well documented. Demonstrate previously learned food science knowledge during preparation of forms i.e. product quality attributes associated with food safety, labelling, food processing techniques. Forms properly formatted (date of preparation, signature of responsible HACCP personnel). HACCP team adds B, C, and P symbols after completion of hazard analysis in subsequent section of course.	**Basic product information** forms are completed but demonstrate a tendency towards rote behaviour from available HACCP generic models.	Forms incomplete and do not include details of case study. Important product quality attributes missing,	Significant details omitted in forms. Form 2, List of Inputs does not match Form 3, Process Flow diagram. Incomplete process flow: not all steps included.
Form 4 Plant Schematic - plant with allergens		Schematic shows all material and personnel flows with well defined legend for the map. Other food safety details such as hand wash stations, waste containers and sanitation stations identified. Areas of cross contamination (raw/processed, allergens) clearly identified.	Plant schematic matches Form 3, process flow diagram. Some distinction between materials and personnel flow in legend. Incomplete identification of allergen cross contamination risks.	Unclear distinction between materials and personnel flow. No identification of cross contamination risks; no hazard symbols on map.	No legend. Plant schematic flow does not match Form 3, Process Flow diagram
Hazard Analysis					

FNH 403 Food Law, Regulations and Quality Assurance Grading Rubric					
Section	Possible Marks	Excellent	Good	Needs Improvement	Unacceptable
Critical Control Point (CCP) Determination and Control		Demonstrates knowledge of food processing techniques. CCP properly identified using decision tree. HACCP principles 1-7 are applied correctly. Person responsible, task and method frequency for each principle. Record keeping includes related records from applicable preventive control measures associated with CCP.	Principles 1-7 addressed but corrective actions incomplete.	Records (principle 7) incomplete, lacks detail.	Lacking background processing knowledge and experience to prepare a HACCP plan with sufficient detail.
Individual Preventive Controls Quiz	10	Match Prerequisite Program name to criteria of the program.			Do not submit
Individual Hazard Analysis Assignment	15	Complete two part hazard description statements for specific process steps. Use correct format.			Do not submit
Preparation of Standard Operating Procedure (SOP) for Preventive Control Measure.	10	SOP is properly formatted, purpose, task, frequency, corrective actions, records, person responsible. Suitable for use as a training tool in a food processing establishment. Auditable details such as created date, revision date and signature are included.	Corrective actions missing. Poorly formatted.	Standard Operating Procedure not suitable for stated purpose. Does not meet requirements of preventive control measure i.e. sanitation program, allergen control program	Lacking background processing knowledge and experience to prepare a SOP with sufficient detail.
Section 4 – Statistical Process Control and 7 Quality Tools					
Canvas Quiz 2 *7 quality tools (use of memory jogger)* *Scatter Diagram* *Pareto Chart* *Histogram*	15	Completes Memory Jogger reading assignments listed in Canvas Complete quiz	Completes quiz		Quiz not submitted by deadline and student requests that the quiz be re-released.

FNH 403 Food Law, Regulations and Quality Assurance Grading Rubric					
Section	Possible Marks	Excellent	Good	Needs Improvement	Unacceptable
Cause and Effect Diagram ***The case of the bad butterfat.***	10	Problem statement is complete (Effect) Group uses follows brainstorming Use information in case to construct All questions answered. Analysis of cause and effect diagram	Identifies cause of poor- quality product. No hypothesis to test identified	Problem statement does not accurately describe the situation in the case study.	No problem statement. Few causes on cause and effect diagram.
Cause and Effect Diagram ***The case of the bad butterfat.***	8	Individual Quiz to be done before tutorial	Completes quiz		Quiz not submitted by deadline and student requests that the quiz be re- released.
Control Charts	Group participation activity	Prepare control chart and determine assignable cause	Prepare control chart. No analysis of problem.	Calculations correct.	Calculations incorrect or not complete.
Acceptance Sampling	Group participation activity	Complete problem set			Calculations incorrect or not complete.