MODULE 3: Safety and Quality Assurance in Food Processing Industry

COURSE TITLE: 3.2 QUALITY AND SAFETY MANAGEMENT SYSTEMS IN FOOD PROCESSING INDUSTRIES/OR/COURSE TITLE: SAFETY AND STANDARDIZATION OF FOOD PRODUCTS

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CREDITS: 3 (3-0-6)

1 credit: 1 h/week (15 h)
(Lecture-Practice-Self learning)
Class (contact hours): 45 H (15 weeks)
Self-learning (Assignment, Presentation, Case study, Self study): 90 H (15 Weeks)
TOTAL: 135 H/SEMESTER (15 Weeks)

LANGUAGE OF COURSE DELIVERY:

ENGLISH or FRENCH, and national languages (THAI, VIETNAMESE, KHMER)

WORKLOAD: 135H

(/25h=5 ECTS): 45 contact hours + 90h self-learning (1 credit=15h)
Semester:

PREREQUISITES: MICROBIOLOGY, CHEMISTRY, FOOD TECHNOLOGY

COURSE OBJECTIVES

To provide the students with knowledge on the need for quality assurance, standardization, transparency, and traceability in the food supply chain and food safety. The course emphasizes food quality control as the mechanism for the prevention of food-borne illness and food spoilage at the food manufacturing processes, storage and retail levels.

LEARNING OUTCOMES

Upon completion of this course, the students will:

LO1: be able to identify the importance of hazards as well as standard regulations and procedures in food processing practices

LO2: Understand the difference between food quality management system (FQMS) and food safety management system (FSMS)

LO3: be able to implement quality management systems and food safety management systems into the food process industry

LO4: be able to synthesize and apply the relevant food safety and/or food standard legislation in both national, regional and international levels

LO5: be able to understand the traceability system and tools currently used in the food industries

LO6: be able to plan and conduct the audits in food processing industries

LO7: be able to research a topic, synthesis current information and develop a presentation related to food safety and food quality management

Benchmark LOs				Suggested
	Knowledge	Skills	Competence	EQF levels
LO1	X			6
LO2	X			6

LO3	X	X		6
LO4	X			6
LO5	X	X	X	7
LO6	X	X	X	7
LO7		X	X	7

COURSE OUTLINE

1. **Overview on Food Safety and Food Quality Issues**
   - 1.1. Food safety vs. food quality
   - 1.2. quality control – quality assurance
   - 1.3. Overview on national food legislation
   - 1.4. Food labeling and standards
   - 1.5. Current issues in food safety
2. **Food Quality Management Systems (FQMS) and Food Safety Management Systems (FSMS)**
   - 2.1. Principles and practices of FQMS and FSMS in food processing
   - 2.2. Good Manufacturing Practices (GMPs) and HACCP concept
   - 2.3. Quality Management (QM) systems in food industries and food supply chain systems

   Management responsibilities, vision – mission - quality policy, Management tools, quality function deployment, house of quality, FMEA, documentation (SOP),

   FSCC 22000, BRC
   - 2.4. Continuous improvement in Food Processing Industries
   - 2.5. Management of testing equipment

   Two Case Studies: One relevant to FQMS and One to FSMS
3. **Legislation and Regulations for Food Processing Industries**
   - 3.1. Basics of food laws
   - 3.2. Regulatory requirements for quality and safety of food products
   - 3.3. CODEX Alimentarius, WTO-SPS agreement and other regulatory bodies including FAO/WHO.
   - 3.4. Harmonization of standards

   Case study3: National, Regional and International standards for food and beverage processing industries
4. **Risk Analysis and Management Systems in Food Processing Industries**
   - 4.1. Principles of Risk Analysis
   - 4.2. Risk assessment and risk management at manufacturing industries
   - 4.3. Risk communication and documentation

   Assignment 1
5. **Traceability in Food Supply Chain Systems,**
   - 5.1. Developing traceability systems across the food supply chain: an overview
   - 5.2. Traceability for food safety and quality control
   - 5.3. Technology for traceability (bar code, RFID, DNA profiling, remote sensing etc.)
6. **Auditing in food processing industries**
   - 6.1. Principles, types and methods of auditing
   - 6.2. Documentation and reporting

Assignment2

LABORATORY SESSION: NONE

Learning Outcomes (LOs)- Course Content Matrix

		1	2	3	4	5	6
	LO1	X	X				
	LO2	X	X	X			
	LO3	X	X	X	X		
	LO4			X	X		
	LO5			X		X	
	LO6			X			X
	LO7	X	X	X	X	X	X

Skills Development Matrix

Skills (Discipline specific)	
	I
Labeling and standardization of food products	IP
Food safety management tools	IPA
Food Quality Management tools	IPA
Risk Identification, Assessment and Control methods	IPA
Traceability techniques	I
Auditing techniques for food safety and quality control	IP
Documentation management	IPA
Transferable Skills	
Independent learning	P
Time management	P
Oral communication	PA
Written Communication	PA
Co-operative learning	P
Leadership	P

Outcome-Method Table

Intellectual Outcomes

Intellectual outcomes	Teaching methods or activities
Students will be better able to:	
1. Understand the principles of management of food quality and food safety	Classroom lecture, case studies, webinar, factory visits, on-line tutorial
2. Identify and critically evaluate food safety hazards and determine their significance(s) as risk to public health in food operation and	Classroom lecture, case studies, webinar, factory visits, on-line tutorial

production	
3. Critically evaluate national and international legislation and standards to operate food industries	Classroom lecture, case studies, webinar, factory visits, on-line tutorial

Skills Outcome

Skills outcome	Teaching methods or activities
Students will demonstrate the ability to:	
1. Apply the principles of food quality and food safety management systems including continual improvement cycle,	Classroom lecture, case studies, webinar, on-line tutorial
2. Apply and perform the HACCP methodology and food safety verification programme (GMP, GHP, SSoP)	Classroom lecture, case studies, webinar, on-line tutorial
3. Apply the tools to maintain and/or improve the food quality (e.g. TQM, TPM, Sigma rule, Zero defect)	Classroom lecture, case studies, webinar, , on-line tutorial
4. Synthesize and apply the relevant food safety and/or food standard legislation in both local and international levels	Classroom lecture, case studies, webinar, on-line tutorial
5. Identify and analyze the risk	Classroom lecture, case studies, webinar, on-line tutorial
6. Auditing techniques and documentation	Classroom lecture, case studies, webinar, on-line tutorial

Attitudinal Outcome

Attitudinal outcomes	Teaching methods or activities
Students will increasingly be able to:	
1.systemically search, select and evaluate the literature and other relevant materials on food safety	Case studies, factory visits, on-line directed self-learning, Group study
2. Plan and manage to do the research and identify issues related to food quality and food safety legislation and standards for the industries	Case studies, factory visits, on-line directed self-learning, Group study
3. Be responsible towards food quality and food safety	Case studies, factory visits, on-line directed self-learning,

Learning Resources:

Textbooks: No designated textbook, but class notes and handouts will be provided.

Reference Books:

1. Evans, L. T. (1993). *Crop Evolution and Yield*. Cambridge University Press.
2. Kropff, K.J. (1997). *Application of Systems Approaches at the Field Level*. Kluwer Academic Publisher, The Netherlands.
3. Debby N. (2013). *Food Safety Management Programs: Applications, Best Practices and Compliance, CRC Press*, UK and USA.

4. Yasmine M., & Hubb, L. (2013). *Food Safety Management: A Practical Guide to the Industry*. Elsevier.

Journals and Magazines:

1. Food Control, Elsevier
2. Food Policy, Elsevier
3. Food Research International, Elsevier
4. Industrial Crops and Products, Elsevier
5. Postharvest Biology and Technology, Elsevier
6. Innovative Food Sciences and Emerging Technologies, Elsevier
7. Trends in Food Science and Technology, Elsevier
8. Journal of Food Safety, John Wiley & Sons

TEACHING AND LEARNING METHODS

The course is delivered via lectures, webinars, reading materials including the recent literatures and practical problem solving in food safety issues. . Additional online and recent information will be provided to enhance self-learning experiences. Active learning is encouraged and students' understanding of each modules or subtopics is evaluated via featured examples, practical questions, relevant case studies, homework and presentation. .

Time Distribution and Study Load:

1. Lecture: 45 hours
2. Assignments: 15 h
3. Case study and presentation: 40 h
4. Self study: 35 hours

EVALUATION SCHEME

The final grade will be based on the following weight distribution: Assignments (20%), Case studies and presentation (30%) mid semester exam (20%) and final exam (30%)

An "A" would be awarded if a student can show the ability having elaborative knowledge on; elaborate, formulate and solve problems related to this module. A "B" would be awarded if a student shows an overall understanding of the topics covered, a "C" would be given if a student meets below expectation on both knowledge acquired and analysis. A "D" would be given if a student does not meet basic expectations of the topics presented in the course.

Assessment Specification Grid

Activities	LO1	LO2	LO3	LO4	LO5	LO6	Total
Assignment1		5	5				10
Assignment2				4	6		10
Case study1				3	2	5	10
Case study 2				3	2	5	10
Case study 3			5			5	10
Examination	5	10	15	10	10		50
Total	5	15	25	20	20	15	100

Assessment of Case study and Assignments:

- Understanding the concept and topics properly
- Demonstrate the specifically sound of the evident-based case analysis
- Concise reviewing the relevant literature on the relevant topics

- Interpret the acquired data and analyze scientifically
- Describe the results comprehensively and writing skills in the report
- Clear oral presentation
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Instructor:

Prepared By:

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Reviewed by

Name	University or Company	Country
Marie-Louise SCIPPO	Ulg	Belgium

ALIGNMENT MATRIX OF MODULE LEARNING OUTCOMES

Corresponding EQAS LO	Module LO	Units developing the LO	Extent of alignment with EQAS LO (maximum total for an EQAS LO 100%)
Learning Outcomes for Food Safety and Microbiology			
Describe the properties of common food spoilage organisms. Experimentally determine their presence and numbers. Demonstrate a critical understanding of instances of food spoilage, causation and prevention.	LO1: be able to identify the importance of hazards as well as standard regulations and procedures in food processing practices		
Describe the properties of common food poisoning organisms, their toxins and means of detection. Experimentally determine the presence of food poisoning organisms. Demonstrate a working knowledge of food-borne infections/intoxications, evaluating causation and prevention.	LO1: be able to identify the importance of hazards as well as standard regulations and procedures in food processing practices		
	LO5: be able to understand the traceability system and tools currently used in the food industries		
Recognize and describe the principles and limitations of food preservation. Exercise appropriate judgment on the suitability of different preservation methods to	LO1: be able to identify the importance of hazards as well as standard regulations and procedures in food processing practices		

Corresponding EQAS LO	Module LO	Units developing the LO	Extent of alignment with EQAS LO (maximum total for an EQAS LO 100%)
particular foods; give some practical examples. Critically discuss the effects of intrinsic and extrinsic factors on shelf-life and safety of foods. Give practical examples and some indications of the benefits of predictive modelling.			
Learning Outcomes for Food Chemistry and Analysis			
Demonstrate an awareness of the relationship between food, nutrition and health.	LO1: be able to identify the importance of hazards as well as standard regulations and procedures in food processing practices		
Quality Management and the Law			
Demonstrate an understanding of the principles of quality management systems in the food industry, the range of documentation required and its use.	LO1: be able to identify the importance of hazards as well as standard regulations and procedures in food processing practices		
	LO2: Understand the difference between food quality management system (FQMS) and food safety management system (FSMS)		
	LO3: be able to implement quality management systems and food safety management systems into the food process industry		
	LO5: be able to understand the traceability system and tools currently used in the food industries		
	LO6: be able to plan and conduct the audits in food processing industries		
Describe the legal framework that applies to the food industry, the principle legal requirements, enforcement and the penalties that can be applied within a defined jurisdiction.	LO4: be able to synthesize and apply the relevant food safety and/or food standard legislation in both national, regional and international levels		
	LO5: be able to understand the traceability system and tools currently used in the food industries		
	LO6: be able to plan and conduct the audits in food processing industries		

Corresponding EQAS LO	Module LO	Units developing the LO	Extent of alignment with EQAS LO (maximum total for an EQAS LO 100%)
Demonstrate a critical understanding of the role of food provenance in maintaining food quality. Undertake an analysis demonstrating how a food product can be authenticated.	LO5: be able to understand the traceability system and tools currently used in the food industries		
	LO7: be able to research a topic, synthesis current information and develop a presentation related to food safety and food quality management		
Generic Competences Communication abilities, ethics and personal skills			
Able to plan and carry out an experimental investigation under supervision and write a scientific report following standard conventions.	LO6: be able to plan and conduct the audits in food processing industries		
Communicate scientific ideas through written, oral and visual means in English. Able to discuss these ideas at a higher level.	LO6: be able to plan and conduct the audits in food processing industries		
	LO7: be able to research a topic, synthesis current information and develop a presentation related to food safety and food quality management		
Demonstrate autonomy, self-direction, initiative and effective decision making in complex and unpredictable situations.	LO6: be able to plan and conduct the audits in food processing industries		
	LO7: be able to research a topic, synthesis current information and develop a presentation related to food safety and food quality management		