

## Course Syllabus

**offered by Department of Chemistry  
with effect from Semester A 2020/21**

This form is for the completion by the Course Leader. The information provided on this form is the official record of the course. It will be used for the City University's database, various City University publications (including websites) and documentation for students and others as required.

Please refer to the Explanatory Notes on the various items of information required.

**Prepared / Last Updated by:**

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**City University of Hong Kong  
Course Syllabus**

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**Part I Course Overview**

<b>Course Title:</b>	Food Microbes, Toxins and Public Health
<b>Course Code:</b>	CHEM4079
<b>Course Duration:</b>	1 semester
<b>Credit Units:</b>	4 credits
<b>Level:</b>	B4
<b>Proposed Area:</b> <i>(for GE courses only)</i>	<input type="checkbox"/> Arts and Humanities <input type="checkbox"/> Study of Societies, Social and Business Organisations <input type="checkbox"/> Science and Technology
<b>Medium of Instruction:</b>	English
<b>Medium of Assessment:</b>	English
<b>Prerequisites:</b> <i>(Course Code and Title)</i>	CHEM2003/BCH2003 Biochemistry CHEM2013/BCH2013 Microbiology CHEM2066/BCH2066 Cell Biology
<b>Precursors:</b> <i>(Course Code and Title)</i>	Nil
<b>Equivalent Courses:</b> <i>(Course Code and Title)</i>	BCH4079 Food Microbes, Toxins and Public Health
<b>Exclusive Courses:</b> <i>(Course Code and Title)</i>	Nil

## Part II Course Details

### 1. Abstract

(A 150-word description about the course)

This course aims to provide essential knowledge in food microbes, microbial toxins, their interactions in food and their impact on public health to students with a background in microbiology. Laboratory skills relating to microbiological examination and detection of biotoxins of different food types, using traditional and latest technology to enable students to be competent professionals in a food microbiology laboratory.

The course will centre on the following major themes:

- Food microbes: diversity, sources, growth and metabolism, beneficial uses and spoilage mechanisms.
- Microbial toxins: diversity, occurrence, mechanisms of action, bioavailability, acute and chronic toxicity to humans.
- Food safety: detection methods of microbial spoilage of foods including toxins, quality control and legislative requirements for protection of public health.

### 2. Course Intended Learning Outcomes (CILOs)

(CILOs state what the student is expected to be able to do at the end of the course according to a given standard of performance.)

No.	CILOs <sup>#</sup>	Weighting* (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			A1	A2	A3
1.	Describe and analyse the diversity, characteristics, sources of microorganisms and microbial toxins in food and the beneficial uses of food microbes.		✓	✓	
2.	Integrate the causes and effects of food spoilage and mechanisms of microbial toxin action, short-term and long-term toxicity to human health.		✓	✓	
3.	Perform laboratory procedures on analyses of food microbes and toxin detection. Critically review and evaluate the advantages and limitations of the existing analytical approaches, bioassays and biosensors developed for toxins detection and monitoring in foods.			✓	✓
4.	As a team, identify food safety/public health research topics related to food microbes and microbial toxins with a local context followed by design of experiments to solve the research questions and critically evaluate the solutions provided.			✓	✓
		100%			

\* If weighting is assigned to CILOs, they should add up to 100%.

<sup>#</sup> Please specify the alignment of CILOs to the Gateway Education Programme Intended Learning outcomes (PILOs) in Section A of Annex.

A1: Attitude

Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability

Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to self-life problems.

A3: Accomplishments

Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative

works/new artefacts, effective solutions to real-life problems or new processes.

### 3. Teaching and Learning Activities (TLAs)

(TLAs designed to facilitate students' achievement of the CILOs.)

TLA	Brief Description	CILO No.				Hours/week (if applicable)
		1	2	3	4	
Lectures, laboratory exercises, on-line resources, in-class activities and visits	Teaching and learning will be based on a combination of lectures, laboratory exercises, and provision of online resources. Active learning processes would involve in-class activities such as think-pair-share, answering MPQs on mobile devices, and application of one-minute paper. Blog discussions will be encouraged to enhance collaborate learning. Visits to food production factories will be arranged whenever possible.	✓	✓			
Laboratory exercises and on-line discussions	Laboratory exercises to provide the basic skills necessary to be a competent professional in a food microbiology laboratory such as sample preparation, isolation and enrichment, analyses and detection of microbial toxins. On-line discussions based on literature search in scientific journals on methods used in food microbiology and microbial toxin detection.			✓		
Group project and oral presentation	Students will form small groups to undertake the inquiry-based learning project and present a formal group report or poster and defend their findings in an oral presentation.				✓	

### 4. Assessment Tasks/Activities (ATs)

(ATs are designed to assess how well the students achieve the CILOs.)

Assessment Tasks/Activities	CILO No.				Weighting*	Remarks
	1	2	3	4		
Continuous Assessment: <u>40%</u>						
Submitted assignments (including lab reports)	✓	✓	✓		15%	
Class and on-line discussion / participation	✓	✓	✓		5%	
Team project work				✓	15%	
Quizzes	✓	✓	✓		5%	
Examination: <u>60%</u> (duration: 3 hours)						
* The weightings should add up to 100%.					100%	

Starting from Semester A, 2015-16, students must satisfy the following minimum passing requirement for courses offered by CHEM:

**"A minimum of 40% in both coursework and examination components."**

## 5. Assessment Rubrics

(Grading of student achievements is based on student performance in assessment tasks/activities with the following rubrics.)

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
1. Submitted assignments (including lab reports)	Capacity for self-directed learning to comprehend and explain in detail with accuracy the knowledge of food microbes, microbial toxin action and detection	High	Significant	Moderate	Basic	Not even reaching marginal levels
2. Class and on-line discussion / participation	Ability to apply concepts and principles of food microbiology and microbial toxins	High	Significant	Moderate	Basic	Not even reaching marginal levels
3. Team project work	Ability to explain and integrate food microbiology knowledge for microbial toxins detection, impact and control as well as to apply the knowledge in our daily life	High	Significant	Moderate	Basic	Not even reaching marginal levels
4. Quizzes	Ability to explain principles and detection technology for food microbes and microbial toxins, and their impact on human health	High	Significant	Moderate	Basic	Not even reaching marginal levels
5. Examination	Ability to explain and apply the concepts and principles of food microbiology, microbial toxins detection, impact and control	High	Significant	Moderate	Basic	Not even reaching marginal levels

**Part III Other Information** (more details can be provided separately in the teaching plan)

**1. Keyword Syllabus**

*(An indication of the key topics of the course.)*

- Diversity, characteristics, sources of microorganisms and microbial toxins in foods.
- Beneficial uses of microorganisms in foods: fermented food production, food bio-preservatives, food ingredients and enzymes, probiotics.
- Microbial toxins: mechanisms of action, bioavailability, acute and chronic toxicity.
- Microbial food spoilage: factors influencing spoilage, enzymes involved spoilage of specific food groups, spoilage in refrigerated foods.
- Control of microorganisms in foods: principles of control, physical and chemical methods, novel processing technologies, combined methods. Control strategies and HACCP (Hazard Analysis and Critical Control Points).
- Methods in examination of spoiled foods. Rapid and early detection of biotoxins in foods and seafood.

**2. Reading List**

**2.1 Compulsory Readings**

*(Compulsory readings can include books, book chapters, or journal/magazine articles. There are also collections of e-books, e-journals available from the CityU Library.)*

1.	
2.	
3.	
...	

**2.2 Additional Readings**

*(Additional references for students to learn to expand their knowledge about the subject.)*

1.	Food Microbiology: An Introduction. Thomas J Montville & Karl R Matthews. 2nd ed. 2008. ASM Press.
2.	Fundamental Food Microbiology. Bibek Ray. 3rd ed. CRC Press. 2004.
3.	Practical Food Microbiology. D Roberts & M. Greenwood. 2nd ed. 2003.
4.	Microbial Toxins: Methods and Protocols. Edited by H. Otto. Springer (2011).
5.	Microbial Toxins: Current Research and Future Trends. Edited by Thomas Proft. Caister Academic Press (2009).
6.	Food Safety: Contaminants and Toxins. Edited by JPF D’Mello. CABI Publishing (2003).
7.	Online Resources: To be provided, as required, in lectures and tutorials.

Please specify the Gateway Education Programme Intended Learning Outcomes (PILOs) that the course is aligned to and relate them to the CILOs stated in Part II, Section 2 of this form:

<b>GE PILO</b>	<b>Please indicate which CILO(s) is/are related to this PILO, if any (can be more than one CILOs in each PILO)</b>
PILO 1: Demonstrate the capacity for self-directed learning	
PILO 2: Explain the basic methodologies and techniques of inquiry of the arts and humanities, social sciences, business, and science and technology	
PILO 3: Demonstrate critical thinking skills	
PILO 4: Interpret information and numerical data	
PILO 5: Produce structured, well-organised and fluent text	
PILO 6: Demonstrate effective oral communication skills	
PILO 7: Demonstrate an ability to work effectively in a team	
PILO 8: Recognise important characteristics of their own culture(s) and at least one other culture, and their impact on global issues	
PILO 9: Value ethical and socially responsible actions	
PILO 10: Demonstrate the attitude and/or ability to accomplish discovery and/or innovation	

*GE course leaders should cover the mandatory PILOs for the GE area (Area 1: Arts and Humanities; Area 2: Study of Societies, Social and Business Organisations; Area 3: Science and Technology) for which they have classified their course; for quality assurance purposes, they are advised to carefully consider if it is beneficial to claim any coverage of additional PILOs. General advice would be to restrict PILOs to only the essential ones. (Please refer to the curricular mapping of GE programme: [http://www.cityu.edu.hk/edge/ge/faculty/curricular\\_mapping.htm](http://www.cityu.edu.hk/edge/ge/faculty/curricular_mapping.htm).)*

- A. Please select an assessment task for collecting evidence of student achievement for quality assurance purposes. Please retain at least one sample of student achievement across a period of three years.

<b>Selected Assessment Task</b>