

**City University of Hong Kong  
Course Syllabus**

**offered by Department of Chemistry  
with effect from Semester B 2024 / 25**

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**Part I Course Overview**

<b>Course Title:</b>	<u>Food Processing and Food Chemistry</u>
<b>Course Code:</b>	<u>CHEM6114</u>
<b>Course Duration:</b>	<u>1 Semester</u>
<b>Credit Units:</b>	<u>3 credits</u>
<b>Level:</b>	<u>P6</u>
<b>Medium of Instruction:</b>	<u>English</u>
<b>Medium of Assessment:</b>	<u>English</u>
<b>Prerequisites:</b> <i>(Course Code and Title)</i>	<u>Nil</u>
<b>Precursors:</b> <i>(Course Code and Title)</i>	<u>Nil</u>
<b>Equivalent Courses:</b> <i>(Course Code and Title)</i>	<u>BCH6114 Food Processing and Food Chemistry</u>
<b>Exclusive Courses:</b> <i>(Course Code and Title)</i>	<u>Nil</u>

## Part II Course Details

### 1. Abstract

This course in Food Processing and Food Chemistry will enable students to develop their knowledge and capability in dealing with the composition and properties of food as well as the chemical changes it undergoes during handling, processing and storage. Students will develop their understanding in the effect of chemical and biochemical reactions on the quality and safety of food. They will also identify problems in food sample and apply techniques to solve problems in situations encountered during storage and processing of food.

### 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	Weighting (If applicable)	Discovery-enriched curriculum related learning outcomes (Please tick where appropriate)		
			A1	A2	A3
1.	Demonstrate an understanding of the chemical nature of foods and the major components (carbohydrates, lipids and proteins) of milk, meat, eggs, cereal grains, and fruits and vegetables.		✓	✓	
2.	Analyse the physico-chemical properties of foods.		✓	✓	
3.	Design protocol and apply various techniques in analysing food samples.		✓	✓	✓
4.	Examine the role of natural and synthetic substances that are added to foods and their functionalities.		✓	✓	
5.	Determine the deteriorative chemical and biochemical reactions, and their chemical kinetics in food handling, processing and storage.		✓	✓	✓
		100%			

*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 real-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. Learning and Teaching Activities (LTAs)

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

LTA	Brief Description	CILO No.					Hours/week (if applicable)
		1	2	3	4	5	
	Students will learn the chemical nature of foods and the major components (carbohydrates, lipids and proteins) of milk, meat, eggs, cereal grains, and fruits and vegetables in lectures followed by small group activities.	✓					
	Students will be engaged in small group discussions on literature findings and independent analyses of literature data on selected topics and themes on the analysis of physico-chemical properties of food. Students will also be given online assignment.		✓				
	Through case studies, students will discuss the various spectroscopic techniques and methods that are employed for food analysis.			✓			
	Students will examine the role of natural and synthetic substances that are added to foods and their functionalities through case studies and group projects and presentation.				✓		
	Through case studies, online discussions, group projects, and oral presentations on food processing, students will critically evaluate the applicability and limitations of various food processing strategies/technologies used in the food industry.					✓	

### 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	5		
Continuous Assessment: <u>40</u> %							
Quizzes / Assignments / Discussion	✓	✓	✓	✓		20%	
Group projects and presentation					✓	20%	
Examination: <u>60</u> % (duration: 3 hours)							
						100%	

## 5. Assessment Rubrics

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

Applicable to students admitted in Semester A 2024/25 and thereafter

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
Quizzes / Assignments / Discussion	1. Ability to understand and apply scientific knowledge in food chemistry; 2. Ability to analyse difficulties or problems in food processing and storage;	Able to demonstrate excellent abilities across all topics outlined in the criterion with no mistakes in the assessment task.	Able to demonstrate good abilities in various topics outlined in the criterion with a few minor mistakes in the assessment task.	Able to demonstrate good abilities in key topics of selected areas outlined in the criterion with a few mistakes in the assessment task.	Able to demonstrate basic abilities in isolated topics of selected areas outlined in the criterion with some mistakes in the assessment task.	Fail to demonstrate basic abilities in most topics outlined in the criterion.
Group projects and presentation	1. Ability to identify and analyse the limitations of the current technologies used by the food industry; 2. Ability to apply scientific knowledge in food chemistry to tackle challenges in the food related processes; 3. Ability to propose solutions to tackle limitations in the food industry based on the scientific knowledge in food chemistry.	Able to demonstrate excellent abilities across all topics outlined in the criterion with no mistakes in the assessment task.	Able to demonstrate good abilities in various topics outlined in the criterion with a few minor mistakes in the assessment task.	Able to demonstrate good abilities in key topics of selected areas outlined in the criterion with a few mistakes in the assessment task.	Able to demonstrate basic abilities in isolated topics of selected areas outlined in the criterion with some mistakes in the assessment task.	Fail to demonstrate basic abilities in most topics outlined in the criterion.
Examination	1. Ability to explain in detail the chemical changes in food under different conditions and in various food processing; 2. Ability to explain the functional properties of different food components and ingredients; 3. Ability to propose solutions to tackle challenges in the food related processes based on the scientific knowledge in food chemistry.	Able to demonstrate excellent abilities across all topics outlined in the criterion with no mistakes in the assessment task.	Able to demonstrate good abilities in various topics outlined in the criterion with a few minor mistakes in the assessment task.	Able to demonstrate good abilities in key topics of selected areas outlined in the criterion with a few mistakes in the assessment task.	Able to demonstrate basic abilities in isolated topics of selected areas outlined in the criterion with some mistakes in the assessment task.	Fail to demonstrate basic abilities in most topics outlined in the criterion.

Applicable to students admitted from Semester A 2022/23 to Summer Term 2024

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B)	Marginal (B-, C+, C)	Failure (F)
Quizzes / Assignments / Discussion	1. Ability to understand and apply scientific knowledge in food chemistry; 2. Ability to analyse difficulties or problems in food processing and storage;	Able to demonstrate excellent abilities across all topics outlined in the criterion with no mistakes in the assessment task.	Able to demonstrate good abilities in various topics outlined in the criterion with a few minor mistakes in the assessment task.	Able to demonstrate good abilities in key topics of selected areas outlined in the criterion with a few mistakes in the assessment task.	Fail to demonstrate basic abilities in most topics outlined in the criterion.
Group projects and presentation	1. Ability to identify and analyse the limitations of the current technologies used by the food industry; 2. Ability to apply scientific knowledge in food chemistry to tackle challenges in the food related processes; 3. Ability to propose solutions to tackle limitations in the food industry based on the scientific knowledge in food chemistry.	Able to demonstrate excellent abilities across all topics outlined in the criterion with no mistakes in the assessment task.	Able to demonstrate good abilities in various topics outlined in the criterion with a few minor mistakes in the assessment task.	Able to demonstrate good abilities in key topics of selected areas outlined in the criterion with a few mistakes in the assessment task.	Fail to demonstrate basic abilities in most topics outlined in the criterion.
Examination	1. Ability to explain in detail the chemical changes in food under different conditions and in various food processing; 2. Ability to explain the functional properties of different food components and ingredients; 3. Ability to propose solutions to tackle challenges in the food related processes based on the scientific knowledge in food chemistry.	Able to demonstrate excellent abilities across all topics outlined in the criterion with no mistakes in the assessment task.	Able to demonstrate good abilities in various topics outlined in the criterion with a few minor mistakes in the assessment task.	Able to demonstrate good abilities in key topics of selected areas outlined in the criterion with a few mistakes in the assessment task.	Fail to demonstrate basic abilities in most topics outlined in the criterion.

### 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.)*

- Introduction to Food Chemistry
- Water and its physico-chemical characteristics
- Carbohydrate components in food
- Chemistry of lipids in relation to lipid characteristics, emulsions and gels
- Protein structure in relation to food characteristics and nutritional value
- Vitamins and their characteristics
- Natural and synthetic food additives and their functionalities in food processing
- Food processing – principles and applications
- Analysis of foods

#### 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.	<i>Food Chemistry</i> , 3 <sup>rd</sup> Edition, O. R. Fennema Ed., Marcel Dekker, Inc., New York, 1996.
2.	<i>Food: The Chemistry of Its Components</i> , 4 <sup>th</sup> Edition, T. P. Coultate Ed., Royal Society of Chemistry, Cambridge, UK, 2002.

##### 2.2 Additional Readings

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

Nil