CHEM6114: FOOD PROCESSING AND FOOD CHEMISTRY

Effective Term
Semester A 2025/26

Part I Course Overview

Course Title
Food Processing and Food Chemistry

Subject Code
CHEM - Chemistry
Course Number
6114

Academic Unit
Chemistry (CHEM)

College/School
College of Science (SI)

Course Duration
One Semester

Credit Units
3

Level
P5, P6 - Postgraduate Degree

Medium of Instruction
English

Medium of Assessment
English

Prerequisites
Nil

Precursors
Nil

Equivalent Courses
BCH6114 Food Processing and Food Chemistry

Exclusive Courses
Nil

Part II Course Details

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.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-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.		x	x	
2	Analyse the physico-chemical properties of foods.		x	x	
3	Design protocol and apply various techniques in analysing food samples.		x	x	x
4	Examine the role of natural and synthetic substances that are added to foods and their functionalities.		x	x	
5	Determine the deteriorative chemical and biochemical reactions, and their chemical kinetics in food handling, processing and storage.		x	x	x

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.

Learning and Teaching Activities (LTAs)

	LTAs	Brief Description	CILO No.	Hours/week (if applicable)
1		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.	1	

2		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.	2	
3		Through case studies, students will discuss the various spectroscopic techniques and methods that are employed for food analysis.	3	
4		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.	4	
5		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.	5	

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("-" for nil entry)	Allow Use of GenAI?
1	Assignments / Discussion	1, 2, 3, 4	10	-	Yes
2	Quizzes	5	30	It is similar to a mid-term examination and a closed-book format.	No

Continuous Assessment (%)

40

Examination (%)

60

Examination Duration (Hours)

3

Minimum Continuous Assessment Passing Requirement (%)

40

Minimum Examination Passing Requirement (%)

40

Assessment Rubrics (AR)

Assessment Task

Quizzes / Assignments / Discussion (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

1. Ability to understand and apply scientific knowledge in food chemistry;
2. Ability to analyse difficulties or problems in food processing and storage;

Excellent

(A+, A, A-) Able to demonstrate excellent abilities across all topics outlined in the criterion with no mistakes in the assessment task.

Good

(B+, B, B-) Able to demonstrate good abilities in various topics outlined in the criterion with a few minor mistakes in the assessment task.

Fair

(C+, C, C-) Able to demonstrate good abilities in key topics of selected areas outlined in the criterion with a few mistakes in the assessment task.

Marginal

(D) Able to demonstrate basic abilities in isolated topics of selected areas outlined in the criterion with some mistakes in the assessment task.

Failure

(F) Fail to demonstrate basic abilities in most topics outlined in the criterion.

Assessment Task

Examination (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

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.

Excellent

(A+, A, A-) Able to demonstrate excellent abilities across all topics outlined in the criterion with no mistakes in the assessment task.

Good

(B+, B, B-) Able to demonstrate good abilities in various topics outlined in the criterion with a few minor mistakes in the assessment task.

Fair

(C+, C, C-) Able to demonstrate good abilities in key topics of selected areas outlined in the criterion with a few mistakes in the assessment task.

Marginal

(D) Able to demonstrate basic abilities in isolated topics of selected areas outlined in the criterion with some mistakes in the assessment task.

Failure

(F) Fail to demonstrate basic abilities in most topics outlined in the criterion.

Part III Other Information

Keyword Syllabus

- 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

Reading List

Compulsory Readings

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

Additional Readings

	Title
1	Nil