

GE1346: THE CHEMISTS KITCHEN (THE SCIENCE OF FOOD AND COOKING)

Effective Term

Semester A 2024/25

Part I Course Overview

Course Title

The Chemists Kitchen (The Science of Food and Cooking)

Subject Code

GE - Gateway Education

Course Number

1346

Academic Unit

Chemistry (CHEM)

College/School

College of Science (SI)

Course Duration

One Semester

Credit Units

3

Level

B1, B2, B3, B4 - Bachelor's Degree

GE Area (Primary)

Area 3 - Science and Technology

Medium of Instruction

English

Medium of Assessment

English

Prerequisites

Nil

Precursors

Nil

Equivalent Courses

Nil

Exclusive Courses

Nil

Part II Course Details

Abstract

This course allows students to discover food and cooking from a scientific point of view with an emphasis on ways to cook better and to have a healthy life. The course material includes some introduction to biology and chemistry. Topics such as food selection, food evaluation and food composition are included. Methods of cooking different foods, such as eggs, meat, poultry, fish and shellfish, are discussed using a scientific perspective. Teaching and learning activities in this course include lectures, tutorial demonstrations, laboratory experiments, short projects and food tasting experiments that will enhance the students' discovery of important scientific issues related to food and cooking. This course will assist students to develop an appreciation of science through cooking, and vice versa.

Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Describe, discuss and explain the basic component and structure of food and the sensory system of humans.	20	x	x	x
2	Apply science principles learnt to describe, discuss and explain how cooking changes the texture and taste of food.	30	x	x	x
3	Demonstrate self-directed learning ability to explore various preparation and cooking methods for different foods and evaluate their effects.	30	x	x	x
4	Demonstrate critical thinking skills to evaluate scientific and social aspects of food and cooking, such as molecular gastronomy, genetically modified food and effects on nutrition and diet.	20	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	Lectures and tutorial discussions	Students will engage in group discussions to explain the scientific aspects of food and cooking.	1, 2, 3, 4	3 hrs/wk for 8 weeks

2	Group presentation and oral quiz	Students will present interactive posters and video projects to enhance their discovery of food and cooking.	1, 2, 3, 4	One 10-minute group presentation (2 to 3 students)
3	Guest lectures	Students will engage in discussions with guests from the local food industry to gain insights into the social and scientific issues related to food and cooking.	1, 2, 3, 4	One 2-hour lecture
4	Laboratory experiments	Through laboratory experiments, students will discover and critically evaluate important current issues of food and cooking such as genetically modified food, diet, nutrition and molecular gastronomy.	2, 3, 4	2 hrs/wk for 4 weeks

Assessment Tasks / Activities (ATs)

ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)	
1	Group presentation and oral quiz (two to three students in a group to explain to peers the science behind a dish of students' own choice; the presentation last for 10 minutes, including an oral presentation to illustrate the relevant science principles of the dish and a video clip to demonstrate the key preparation / cooking processes of the dish and address questions raised by peers and instructors)	1, 2, 3, 4	40	
2	Laboratory work sheet (4 laboratory experiments; each with a work sheet to be handed in at the end of the laboratory session)	2, 3	20	

Continuous Assessment (%)

60

Examination (%)

40

Examination Duration (Hours)

2

Additional Information for ATs

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.”

Assessment Rubrics (AR)

Assessment Task

Group presentation and oral quiz

Criterion

Student demonstrates grasp of the important scientific concepts to various aspects of the topic concerned, and can apply these concepts to solve problems with clear and logical explanations. Evidence of demonstrated use of concepts for rationalization, with some originality in thought and argument. Displays presentation skills.

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

Laboratory work sheet

Criterion

Student demonstrates grasp of the important scientific concepts to the topic concerned. Evidence of demonstrated use of concepts for rationalization. Displays writing skills.

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

Examination

Criterion

Student demonstrates grasp of the important scientific concepts to various aspects of the topic concerned, and can apply these concepts to solve problems with clear and logical explanations. Evidence of demonstrated use of concepts for rationalization, with some originality in thought and argument.

Excellent (A+, A, A-)

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Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Part III Other Information**Keyword Syllabus****Week 1** Chemistry of food components**Week 2** Sensation and food**Week 3** Cooking methods and their effects on food from a scientific perspective**Week 4** Importance of oil and water in food preparation**Week 5** Seafood**Week 6** Vegetables and fruit**Week 7** Meats (pork, beef, poultry)**Week 8** Eggs**Week 9** Pasta and noodles**Week 10** Preparation of tofu, jelly, thickened food, etc. from liquid food and their chemistry**Week 11** Chemistry of baking**Week 12-13** Group presentation**Reading List****Compulsory Readings**

Title	
1	Nil

Additional Readings

Title	
1	Understanding Food: Principles and Preparation, 5th edition, Amy Brown, Cengage Learning, 2015.
2	On Food and Cooking: The Science and Lore of the Kitchen, McGee, Harold, New York: Scribner, 2004.
3	The Science of Good Cooking, The Editors of America's Test Kitchen and Guy Crosby, Cook's Illustrated, 2012.

4	Essentials of Food Science, Vickie A. Vaclavik, Elizabeth W. Christian, New York, NY: Springer 2014.
5	http://www.seas.harvard.edu/cooking
6	http://www.seas.harvard.edu/cooking/cooking_2011
7	http://www.seas.harvard.edu/cooking/science-and-cooking-2012-lecture-series
8	http://www.exploratorium.edu/cooking/index.html

Annex (for GE courses only)

A. 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:

Please indicate which CILO(s) is/are related to this PILO, if any (can be more than one CILOs in each PILO)

PILO 1: Demonstrate the capacity for self-directed learning

1, 2, 3, 4

PILO 2: Explain the basic methodologies and techniques of inquiry of the arts and humanities, social sciences, business, and science and technology

1, 2, 3, 4

PILO 3: Demonstrate critical thinking skills

1, 2, 3, 4

PILO 4: Interpret information and numerical data

1, 2, 3, 4

PILO 5: Produce structured, well-organised and fluent text

1, 2, 3, 4

PILO 6: Demonstrate effective oral communication skills

1, 2, 3, 4

PILO 7: Demonstrate an ability to work effectively in a team

1, 2, 3, 4

PILO 9: Value ethical and socially responsible actions

4

PILO 10: Demonstrate the attitude and/or ability to accomplish discovery and/or innovation

1, 2, 3, 4

B. 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.

Selected Assessment Task

Poster and video presentation