City University of Hong Kong
Course Syllabus

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

Part I Course Overview

Course Title:	Biological Chemistry
Course Code:	CHEM2071(and CHEM2071A)
Course Duration:	1 semester
Credit Units:	4 (3) credits
Level:	B2
Proposed Area: *(for GE courses only)*	☐ Arts and Humanities ☐ Study of Societies, Social and Business Organisations ☐ Science and Technology
Medium of Instruction:	English
Medium of Assessment:	English
Prerequisites: *(Course Code and Title)*	Nil
Precursors: *(Course Code and Title)*	CHEM1200/BCH1200 Discovery in Biology (for normative 4-year students) or A Level Biology (for advance standing I students)
Equivalent Courses: *(Course Code and Title)*	BCH2071 (and BCH2071A) Biological Chemistry
Exclusive Courses: *(Course Code and Title)*	Nil

Note: CHEM2071A does not contain any practical component, and has a credit unit value of three (3).

Part II Course Details

1. Abstract

(A 150-word description about the course)

This course aims to provide students with fundamental chemistry knowledge that is relevant and applicable to biological systems. In this course, students will have an understanding of the chemical structure and function of various biomolecules found in living systems. Students will learn the basic classification systems, functional groups, principles of nomenclature, aromaticity and chirality of organic compounds. Students will be introduced to various fundamental and important biological molecules, including nucleic acids, proteins, carbohydrates and lipids. Through different learning activities such as lectures, tutorials and lab sessions, students will gain comprehensive and in-depth understanding of the functions and biochemical roles of important biomolecules in life and their relationships with human 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[#]	Weighting* (if applicable) (CHEM2071)	Weighting* (if applicable) (CHEM2071A)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
				A1	*A2*	*A3*
1.	Explain the basic concepts/functions of solutes, chemical bonding, organic compounds and homeostasis in biological organisms	10%	15%	✓	✓	
2.	Describe, categorize and identify the basic reaction types and mechanisms of aromaticity and chirality of organic compounds and their chemical properties	25%	25%	✓	✓	
3.	Explain the structures and functions of important biomolecules and their fundamental reactions in biological processes	40%	45%	✓	✓	
4.	Perform experiments to analyse and study the chemical and biochemical properties of important biomolecules	15%	0%	✓	✓	✓
5.	Explain the relationships between biological molecules and human health	10%	15%	✓	✓	✓
		100%	100%			

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

[#] 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	5	
Lectures and tutorials	Teaching and learning primarily based on lectures and tutorials explaining various chemical bonding, functional groups, and classification of organic compounds	✓					6 hrs
Lectures, tutorials and practicals	Teaching and learning based on lectures, tutorials and practicals to explain the structure, chemical reactions and functions of organic compounds		✓				12 hrs
Lectures, tutorials and practicals	Teaching and learning based on lectures, tutorials and practicals to understand the biological functions of biomolecules			✓			18 hrs
Practicals	Teaching and learning will be based on practicals to help students to identify and analyse the chemical and biochemical properties of biomolecules				✓		19 hrs
Group projects and oral presentations	Students will be divided into small groups to carry out group projects and oral presentations to share ideas creatively and critically					✓	3 hrs

4. Assessment Tasks/Activities (ATs)

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

(CHEM2071 only)

Assessment Tasks/Activities	CILO No.					Weighting*	Remarks
	1	2	3	4	5		
Continuous Assessment: 30%							
Assignments		✓				5%	
Quiz			✓			5%	
Lab reports		✓	✓	✓		10%	
Project and oral presentation					✓	10%	
Examination: 70% (duration: 3 hours)							
** The weightings should add up to 100%.*						100%	

(CHEM2071A only)

Assessment Tasks/Activities	CILO No.					Weighting*	Remarks
	1	2	3	4	5		
Continuous Assessment: 30%							
Assignments		✓				10%	
Quiz			✓			10%	
Project and oral presentation					✓	10%	
Examination: 70% (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. Assignments		Excellent understanding of the lecture and tutorial	Good understanding of the lecture and tutorial	Adequate understanding of the lecture and tutorial	Minimum understanding of the lecture and tutorial	Little understanding of the lecture and tutorial
2. Quiz		Excellent understanding of the lecture/tutorial and strong ability to analyse the questions	Good understanding of the lecture/tutorial and ability to analyse the questions	Adequate understanding of the lecture/tutorial	Minimum understanding of the lecture/tutorial	Little understanding of the lecture/tutorial
3. Lab reports (CHEM2071 only)		Excellent understanding of the experiment and perform experiment well	Good understanding of the experiment and complete the whole experiment	Adequate understanding of the experiment and complete the experiment	Minimum understanding of the experiment and fairly complete the experiment	Little understanding of the experiment and cannot complete the experiment
4. Project and oral presentation		Excellent understanding of the project and strong capacity to analyse and synthesize new ideas	Good understanding of the project. Some evidence of critical capacity and analytic ability	Adequate understanding of the subject and some evidence of analytic ability	Minimum knowledge of the project	Little knowledge in the project
5. Examination		Excellent understanding of the lecture/tutorial and strong ability to analyse the questions	Good understanding of the lecture/tutorial and ability to analyse the questions	Adequate understanding of the lecture/tutorial	Minimum understanding of the lecture/tutorial	Little understanding of the lecture/tutorial

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 biological chemistry
- Buffers and indicators
- Organic nomenclature, functional groups and organic reactions
- Biomolecules (i.e. nucleic acids, proteins, carbohydrates and lipids)
- Enzyme classification, catalytic mechanism and kinetics
- Structure, chemical reactions and biological functions of biomolecules
- Bioenergetics and free energy

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.	General, organic, and biological chemistry. Frost, Laura D. author. Deal, Todd S. author. Third edition / Laura Frost, Todd Deal. Upper Saddle River, N.J. : Pearson, 2017
2.	General, organic, and biochemistry Denniston, K. J (Katherine J.) 8th ed. New York, NY : McGraw-Hill Companies, c2014

Annex
(for GE courses only)

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:

GE PILO	**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	
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.)

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.

Selected Assessment Task