

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**

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

Part I Course Overview

Course Title:	Biochemistry
Course Code:	CHEM2003 / CHEM2003A
Course Duration:	1 semester
Credit Units:	3 credits
Level:	B2
Proposed Area: <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
Medium of Instruction:	English
Medium of Assessment:	English
Prerequisites: <i>(Course Code and Title)</i>	Nil
Precursors: <i>(Course Code and Title)</i>	CHEM1200/BCH1200 Discovery in Biology or CHEM2071/BCH2071 Biological Chemistry or CHEM2007/BCH2007 Principles of Organic Chemistry
Equivalent Courses: <i>(Course Code and Title)</i>	BMS2004 Biochemistry BCH2003 / BCH2003A Biochemistry
Exclusive Courses: <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 students:

1. an understanding of the chemical structure of biomolecules involved in mammalian metabolism;
2. concepts in biochemical reactions involved in metabolism;
3. principles behind the free energy flow in several major metabolic pathways and their controls and integration;
4. up-to-date knowledge on the biochemical basis of some human diseases and the biochemical techniques used in biotechnology.

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.	Explain the thermodynamic principles behind the metabolic pathways			✓	
2.	Determine the bioenergetics and chemistry in metabolic reactions		✓	✓	
3.	Identify and explain the regulation of metabolism by hormones and deregulation of metabolism in diseases		✓		
4.	Design experiments to explore the principles in biochemistry and metabolism		✓	✓	✓
5.	Create a concept map relating biochemistry to health and diseases			✓	
		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 will be based on lectures and tutorials explaining the thermodynamic principles employed in metabolic pathways	✓	✓				
Lectures and quizzes	Teaching and learning will be based on lectures and quizzes to determine the bioenergetics and chemistry of metabolic reactions		✓				
Lectures and tutorials	Teaching and learning will be based on lectures and tutorials to explain the importance of regulation of metabolism by hormones and deregulation of metabolism in diseases			✓			
Tutorials and recent primary research articles	Teaching and learning will be based on tutorials and recent primary research articles on biochemistry related to health, diseases, and applications in biotechnology				✓		
Small group activity	Teaching and learning will be based on small group activity in the creation of a concept map relating biochemistry to health and disease based on case studies of applications of biochemistry in human and animal health and society					✓	

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>30%</u>							
Tutorial quizzes and assignments	✓	✓	✓	✓	✓	30%	
Examination: <u>70%</u> (duration: 3 hours)							
						100%	

* The weightings should add up to 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. Tutorial quizzes and assignments	Ability to explain the chemical and biological principles behind the metabolic pathways and integrate the metabolic pathways in various medical conditions and in cancers	Excellent in understanding, explaining, exploring and integrating the knowledge	Good in understanding, explaining, exploring and integrating the knowledge	Partial in understanding, explaining, exploring and integrating the knowledge	Weak in understanding, explaining, exploring and integrating the knowledge	Poor in understanding, explaining, exploring and integrating the knowledge
2. Examination	Ability to explain the chemical and biological principles behind the metabolic pathways and integrate the metabolic pathways in various medical conditions and in cancers	Excellent in understanding, explaining, and integrating the knowledge in written format	Good in understanding, explaining, and integrating the knowledge in written format	Partial in understanding, explaining, and integrating the knowledge in written format	Weak in understanding, explaining, and integrating the knowledge in written format	Poor in understanding, explaining, and integrating the knowledge in written format

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.)

Chemistry, biological functions, metabolic pathways
Thermodynamics, bioenergetics
Metabolism of carbohydrates and lipids
Lipid biosynthesis and fatty acid catabolism
Metabolic integration and cancer metabolism

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.	Lehninger Principles of Biochemistry 7th edition. David L. Nelson and Michael M. Cox. W.H. Freeman and Company, 2017.
2.	Essentials of medical biochemistry : with clinical cases 2nd edition. N.V. Bhagavan, Chung-Eun Ha. Amsterdam ; Oxford : Academic, 2015.

2.2 Additional Readings

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

1.	Cell Metabolism
2.	Science Daily: http://www.sciencedaily.com/news/plants_animals/biochemistry/

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:

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.)

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