

**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:	Principles of Organic Chemistry
Course Code:	CHEM2007 (and CHEM2007A) (and CHEM2007B)
Course Duration:	1 semester
Credit Units:	4 (3) (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>	Nil
Equivalent Courses: <i>(Course Code and Title)</i>	BCH2007 (and BCH2007A) (and BCH2007B) Principles of Organic Chemistry
Exclusive Courses: <i>(Course Code and Title)</i>	Nil

Note: CHEM2007A does not contain any practical component, and has a credit unit value of three (3).

Note: CHEM2007B is for Bachelor of Veterinary Medicine students, contains a 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 an understanding of the basic principles of organic chemistry, practical laboratory experience in chemical transformation and organic analysis (CHEM2007 student only), and develop an understanding of the spectroscopic identification of the various classes of organic compounds.

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) (CHEM2007) (CHEM2007B)	Weighting* (if applicable) (CHEM2007A)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
				A1	A2	A3
1.	Identify the classes of organic compounds, by drawing and interpreting structural formulas, explaining constitutional isomers, stereoisomers and conformational isomers, and describing the principles of electron delocalization and resonance structure.	20%	30%	✓	✓	✓
2.	Describe the definition of Lewis acid and base by using resonance and inductive effects to explain and interpret values of K_a and pK_a of acids.	10%	15%	✓	✓	✓
3.	State and describe the chemistry related to alkanes, alkyl halides, alkenes, alkynes, alcohols, aromatic compounds, amines, carboxylic acids and their derivatives, apply them in analysis and synthesis and draw reaction mechanisms of the more important types of reactions.	45%	55%	✓	✓	✓
4.	Design and implement basic chemical purification, separation, transformations and qualitative analyses in a laboratory and report findings.	25%	0%	✓	✓	✓
* If weighting is assigned to CILOs, they should add up to 100%.		100%	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	
Lectures and tutorials	Teaching and learning will be based on a combination of lectures and tutorials to explain the structure and bonding of organic compounds. Chemistry models will be used to show the three-dimensional nature of molecule. Arrow pushing technique will be introduced.	✓				
Lectures and tutorials	Teaching and learning based on a combination of lectures and tutorials to explain the principles of acid and base and electronic effect. Electron withdrawing and electron donating group will be introduced.		✓			
Lectures and tutorials	Teaching and learning will be based on a combination of lectures and tutorials to explain the principles in reaction and synthesis. Biological, medicinal and environmental applications will be discussed.			✓		
Experiments	Teaching and learning will be primarily by a series of ten experiments some of which are designed by students to be carried out in the laboratory (CHEM2007 only).				✓	

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		
Continuous Assessment: <u>40%</u>						
Tutorial assignment	✓	✓	✓		40%	
Short quizzes	✓	✓	✓			
Short quizzes in the laboratory, laboratory report and continuous assignment in the laboratory (CHEM2007 only)				✓		
Examination: <u>60%</u> (duration: 3 hours for CHEM2007 and CHEM2007A, 2 hours for CHEM2007B)						
* 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. Tutorial assignment	Student completes the activity demonstrates grasp of the important concepts to the topic concerned.	High	Significant	Moderate	Basic	Not even reaching marginal levels
2. Short quizzes	Student completes the activity demonstrates grasp of the important concepts to the topic concerned.	High	Significant	Moderate	Basic	Not even reaching marginal levels
3. Short quizzes in the laboratory, laboratory report and continuous assignment in the laboratory (CHEM2007 only)	Student completes the assessment tasks/activities and demonstrates writing and presentation skills.	High	Significant	Moderate	Basic	Not even reaching marginal levels
4. Examination	Student demonstrates grasp of the important concepts to the topic concerned, and can apply these concepts to solve problems. Strong evidence of demonstrated use of concepts for rationalization, with some originality in thought and argument.	High	Significant	Moderate	Basic	Not even reaching marginal levels

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.)

Carbon compounds: structural and bonding theories, isomers and functional groups
Acids and bases, electronic effect
Alkanes and cycloalkanes: nomenclature, conformational Analysis
Stereochemistry: chiral molecules, stereoisomers
Infrared spectroscopy and UV-vis spectroscopy: structure determination*
Alkyl halides: nucleophilic substitution, reactions of radical
Alkenes and alkynes: elimination and addition reactions*
Alcohols and ethers: oxidation-reduction*
Aromatic compounds: aromaticity, resonance, aromatic substitution*
Carboxylic acid and its derivatives: nucleophilic addition-elimination at the acyl carbon*
Amines*

*Topics are covered only in CHEM2007 and CHEM2007A

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.	Organic Chemistry / T.W. Graham Solomons, Craig B. Fryhle
2.	Introduction To Spectroscopy : A Guide For Students Of Organic Chemistry / Donald L. Pavia, Gary M. Lampman, George S. Kriz, Jr.

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