

Course Syllabus

**offered by Department of Chemistry
with effect from Semester A 2021/22**

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 2021/22**

Part I Course Overview

Course Title:	Organic Chemistry
Course Code:	CHEM3015 (and CHEM3015A)
Course Duration:	1 semester
Credit Units:	4 (3) credits
Level:	B3
Proposed Area: (for GE courses only)	<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: (Course Code and Title)	Nil
Precursors: (Course Code and Title)	CHEM2007/BCH2007 Principles of Organic Chemistry
Equivalent Courses: (Course Code and Title)	BCH3015 (and BCH3015A) Organic Chemistry
Exclusive Courses: (Course Code and Title)	Nil

Note: CHEM3015A 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 an understanding of the principles of carbonyl, aromatic and heterocyclic chemistry and their reaction mechanisms, a practical experience in laboratory in simple and multistep chemical synthesis and characterization of organic compounds, and analytical skill to identify various classes of organic compounds using IR, UV/Vis and NMR spectroscopies and mass spectrometry.

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) (CHEM3015)	Weighting* (if applicable) (CHEM3015A)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
				A1	A2	A3
1.	Describe the principle of aromaticity.	15%	20%	✓	✓	✓
2.	Describe the chemistry of carbonyl and aromatic compounds and their use in chemical synthesis.	15%	20%	✓	✓	✓
3.	Explain the characteristics and mechanisms of various types of reactions related to carbonyl and aromatic compounds with organic reagents and organometallic coupling reactions using e.g. Grignard and organolithium reagents.	20%	25%	✓	✓	✓
4.	Explain the principles of IR, UV/Vis and NMR spectroscopies and mass spectrometry and apply them to identify various classes of organic compounds.	25%	35%	✓	✓	✓
5.	Design and implement organic chemical syntheses and characterization in a laboratory and report their findings. (CHEM3015 only)	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	5	
Lectures and tutorials	Teaching and learning will be based on a combination of lectures and tutorials to explain the structure and bonding of aromatic compounds.	✓					
Lectures and tutorials	Teaching and learning will be based on a combination of lectures and tutorials to explain the chemistry of carbonyl compounds.		✓				
Lectures and tutorials	Teaching and learning will be based on a combination of lectures and tutorials to explain the reaction mechanism and use of carbonyl and aromatic compounds in synthesis.			✓			
Lectures and tutorials	Teaching and learning will be based on a combination of lectures and tutorials to explain the principles of spectroscopy and students will have hands-on experience in using spectroscopic instruments.				✓		
Experiments (CHEM3015 only)	Teaching and learning will be primarily by a series of five experiments some of which are designed by students to be carried out in the laboratory.					✓	

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>							
Short quizzes	✓	✓	✓			30	
Tutorial assignments	✓	✓	✓	✓			
Laboratory reports (CHEM3015 only)					✓		
Examination: <u>70%</u> (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. 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
2. Tutorial assignments	Student completes the activity demonstrates grasp of the important concepts to the topic concerned.	High	Significant	Moderate	Basic	Not even reaching marginal levels
3. Laboratory reports (CHEM3015 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.)

Aromatic and heterocyclic Chemistry

Introduce, with general examples and applications, aromatic and heterocyclic chemistry. Nomenclature. Physical and chemical properties. Preparations and reactions. Ring synthesis.

Carbonyl Chemistry

Introduce, with general examples and applications, carbonyl chemistry. Nomenclature. Physical and chemical properties. Preparations, reactions and use in synthesis.

Reaction Mechanisms

Nucleophilic and electrophilic aromatic substitution. Carbonyl Addition reactions. The influence of electronic and steric factors on the course of chemical reactions. Organometallic coupling reactions using e.g. Grignard and organolithium reagents.

Application of IR, UV/Vis and NMR spectroscopies and mass spectrometry in organic chemistry

Basic principles and uses of these instrumental techniques, with special reference to various characteristic spectroscopic properties of the various classes of organic compounds.

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