

**City University of Hong Kong  
Course Syllabus**

**offered by Department of Chemistry  
with effect from Semester A 2020/2021**

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**Part I Course Overview**

<b>Course Title:</b>	Principles of General Chemistry
<b>Course Code:</b>	CHEM1300
<b>Course Duration:</b>	1 semester
<b>Credit Units:</b>	3 credits
<b>Level:</b>	B1
<b>Proposed Area:</b> <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
<b>Medium of Instruction:</b>	English
<b>Medium of Assessment:</b>	English
<b>Prerequisites:</b> <i>(Course Code and Title)</i>	Nil
<b>Precursors:</b> <i>(Course Code and Title)</i>	Nil
<b>Equivalent Courses:</b> <i>(Course Code and Title)</i>	BCH1100 Chemistry
<b>Exclusive Courses:</b> <i>(Course Code and Title)</i>	CHEM1101 Introduction to Chemistry GE1357 Introduction to Chemistry

## Part II Course Details

### 1. Abstract

(A 150-word description about the course)

This course aims to provide an introduction to the fundamental concepts in chemistry to undergraduate students major in chemistry and related disciplines, and prepare them to study more advanced chemistry courses.

Upon completion of this course, students should be able to:

- demonstrate an understanding of the basic concepts and principles of Chemistry,
- observe simple chemical reactions and understand their nature,
- gain knowledge and skills regarding chemistry experiments and awareness of common hazards.

### 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 <sup>#</sup>	Weighting* (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			A1	A2	A3
1.	Describe the concept of atoms, molecules, and ions, neutrons, protons and electrons, the periodic table, chemical formula. Rationalize the electronic structures of atoms, ions, and molecules and chemical compounds through the formation of ionic and covalent bonds and explain their physical and chemical properties.	20%	✓	✓	
2.	Use organic nomenclature. Understand different types of chemical bond in organic chemistry. Describe and apply the concepts of molecular polarity and intermolecular forces in correlation with boiling and melting points of compound.	20%	✓	✓	
3.	Apply the principles of stoichiometry and moles and relate these to mass balance, empirical and molecular formula, and chemical equation. Realize the states of matter.	20%	✓	✓	
4.	Apply the principles of chemical kinetics to evaluate the reaction rate and evaluate equilibrium constants in chemical equilibria and predict the equilibria position with Le Châtelier's principle.	20%	✓	✓	
5.	Realize the classification of acids and bases. Understand the oxidation and reduction reactions.	20%	✓	✓	
		100%			

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

<sup>#</sup> 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, interactive questioning and tutorials, and videos	Enable students to recognize the basic knowledge and concepts and the relationship between them, and give them practice in explaining these to peers.	✓					
Lectures, interactive questioning and tutorials, and laboratory sessions videos	Enable students to acquire the basic knowledge and concepts in inorganic and organic chemistry and give them practice in explaining these to peers. Allow students to carry our laboratory experiments.		✓				
Lectures, interactive questioning and tutorials, and videos	Enable students to recognize the basic knowledge and concepts and the relationship between them, and give them practice in explaining these to peers.			✓			
Lectures, interactive questioning and tutorials, and laboratory sessions videos	Enable students to appreciate the basic knowledge and concepts embedded in real-world issues with significant chemical context, and give them practice in explaining these to peers. Allow students to carry our laboratory experiments.				✓		
Lectures, interactive questioning and tutorials, and laboratory sessions videos	Enable students to realize the basic knowledge and concepts and the relationship between them, and give them practice in explaining these to peers. Allow students to carry our laboratory experiments.					✓	

### 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>							
Tutorials and assignments, online learning, peer reviewed quizzes, discussion	✓	✓	✓	✓	✓	15%	
Laboratory work and reports	✓	✓	✓	✓	✓	15%	
Examination: <u>70%</u> (duration: 2 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. Tutorials and assignments, online learning, peer reviewed quizzes, discussion	Capacity for self-directed learning to understand the basic principles of chemistry  Ability to apply basic knowledge and important concepts of chemistry for rationalization and to solve chemical problems	High	Significant	Moderate	Basic	Below marginal level
2. Laboratory work and reports	Ability to apply basic knowledge and important concepts of chemistry to explain in detail chemical phenomena	High	Significant	Moderate	Basic	Below marginal level
3. Examination	Ability to apply basic knowledge and important concepts of chemistry for rationalization and to solve chemical problems	High	Significant	Moderate	Basic	Below marginal level

### 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.)*

Basic Concepts in Chemistry  
Atoms, Ions, and Molecules  
Periodic Table  
Electronic Structure of Atoms  
Chemical Bonding: Ionic and Covalent  
Stoichiometry: Calculations with Chemical Formulas and Equations  
States of Matters: Gases, Liquids, and Solids  
Chemical Kinetics and Equilibrium  
Thermochemistry  
Acids and Bases  
Oxidation and Reduction  
Inorganic and Organic Chemistry  
Electrochemistry

#### 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.	
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##### 2.2 Additional Readings

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

1.	“Chemistry: The Central Science”, 13th Edition, T. L. Brown, H. E. LeMay, Jr., B. E. Bursten, C. J. Murphy, P. M. Woodward, M. W. Stoltzfus, Pearson Education Limited Hall (ISBN 9781292057712)
2.	“Introduction to Chemistry – A Conceptual Approach”, 2nd Edition, R. C. Bauer, J. P. Birk, P. S. Marks, McGraw-Hill (ISBN 9780070172623)
3.	“Chemistry in Context: Applying Chemistry to Society”, 6th Edition, L. P. Eubanks, C. H. Middlecamp, C. E. Heltzel, S. W. Keller, McGraw-Hill (ISBN 9780071270137)
4.	“Chemistry”, 9th Edition, S. S. Zumdahl, S. A. Zumdahl, Brooks/Cole Cengage Learning (ISBN 9781133611097)