CIR-DEGREE

香港城市大學
City University of Hong Kong

Curriculum Information Record for a Major/Degree

Department of Chemistry
Effective from Semester A 2022/23
For Students Admitted/Changed to the Major with Catalogue Term Semester A 2021/22 and thereafter

The information provided on this form is the official record of the major/degree. It will be used for City University's database, various City University publications (including websites) and documentation for students and others as required.

In specifying the curriculum for a major/degree, "catalogue term" is used to determine the set of curriculum requirements that a student is following. By mapping the student record and the version of curriculum rules applicable, the graduation requirements of individual students will be evaluated accordingly. The catalogue terms of curriculum requirements that students will follow are summarized below (BUS/04/A5R):

Requirements	Catalogue Term
a) Common Requirements • Gateway Education • University Language • College/School requirement	The same as student's admission term
b) Major • For normative 4-year degree students who will join the majors allocation exercise	Effective term of the declared major
• For advanced standing students and 4-year degree students who already have a major at the time of admission	The same as student's admission term
• For students who have changed major	Effective term of the changed major
c) Stream	Follow the effective term of the associated major

Prepared / Last Updated by

Name:	Prof. Kenneth Lo	Academic Unit:	Department of Chemistry
Phone/email:	3442 7231 / bhkenlo@cityu.edu.hk	Date:	14 June 2022

City University of Hong Kong

Curriculum Information Record for a Major/Degree

Department of Chemistry
Effective from Semester A 2022/23
For Students Admitted/Changed to the Major with Catalogue Term Semester A 2021/22 and thereafter

---

Part I Major/Degree Overview

Degree	(in English)	:	Bachelor of Science and Master of Science
	(in Chinese)	:	理學士與理學碩士
Award Title[#]	(in English)	:	Bachelor of Science in Chemistry and Master of Science in Chemistry
	(in Chinese)	:	理學士(化學) 與理學碩士(化學)

 # Please make reference to the "Guidelines on Award Titles" approved by the Senate when proposing new award titles or changes to existing award titles (Senate/86/A5R).

Note 1: For students with recognised Advanced Level Examination or equivalent qualifications.
Note 2: For Associate Degree/Higher Diploma graduates admitted to the senior year.

1. Normal and Maximum Period of Study

Normal period of study	4 years
Maximum period of study	8 years

2. Minimum Number of Credit Units Required for the Award and Maximum Number of Credit Units Permitted

Degree Requirements	**No. of Credit Units**
Gateway Education requirement *****	30 credit units
College/School requirement *****	6 credit units
Major requirement	66 credit units (Core: 38; Elective: 28)
Free electives / Minor (if applicable)	18 credit units
Minimum number of credit units required for BSc award	**120 credit units**
Maximum number of credit units permitted for BSc award	**144 credit units**
Number of credit units required for MSc award	**30 credit units****

****** For details, please refer to the Curriculum Information Record for Common Requirements.*
*** 9 credit units from a selection of courses can be nominally transferred from BSc award.*

3. Aims of Programme

This 3-year Undergraduate plus 1-year Taught Postgraduate Programme ('3+1' Programme) aims to:

- *provide students with a firm foundation in chemical sciences with a focus on analytical chemistry, environmental chemistry, inorganic chemistry, organic chemistry, and physical chemistry;*
- *train students with highly marketable and independent research skills and experiences in a wide range of advanced chemistry disciplines, such as catalysis, synthetic chemistry, materials & biomaterials chemistry, analytical & bio-analytical science, computational chemistry, environmental chemistry and chemical biology;*
- *produce graduates with exceptional intellectual, analytical, problem solving, critical thinking, and technical skills through intensive and vigorous learning in chemistry to meet local, regional and global demands in the industrial, commercial, government and education sectors.*

.

4. Intended Learning Outcomes of Programme (PILOs)

(Please state what the student is expected to be able to do on completion of the '3+1' Programme according to a given standard of performance.)

Upon successful completion of this '3+1' Programme, students should be able to:

No.	*PILOs*	*Discovery-enriched curriculum related learning outcomes (please tick where appropriate)*		
		A1	*A2*	*A3*
BSc Award				
	Describe the general chemical principles appropriate to the study of chemistry.			
1.	• Explain the important aspects of chemical terminology, nomenclature, convention and units.	√		
2.	• Describe the structure and properties of atoms, ions, molecules and materials.	√		
3.	• Apply the principles of thermodynamics and kinetics to chemistry.	√	√	
4.	• Apply the principles and procedures used in chemical analysis and characterization.	√	√	
	Competently perform a wide range of laboratory and technical procedures in chemistry.			
5.	• Handle chemicals in a professional manner, through knowledge and adherence to chemical safety legislation.	√	√	
6.	• Operate laboratory procedures in synthetic and analytical chemistry.		√	
7.	• Evaluate experimental data through testing hypotheses, defining problems and creating innovative and practical solutions.		√	
8.	• Communicate and cooperate with other personnel and participate as an effective team member.	√	√	
	Critically evaluate experiments in chemistry as reported in the literature and synthesize information in a constructive manner.			
9.	• Demonstrate the ability in oral and written presentations and recognize the limitations inherent in hypotheses.		√	
10.	• Develop strategies for creating, updating, maintaining and enhancing knowledge in chemistry.		√	√
	Identify, analyze and reflect upon the responsibilities of chemists by applying chemical knowledge to society, commerce and the environment.			
11.	• Apply knowledge of synthetic chemistry for the discovery and design of compounds with new and interesting properties.		√	√
12.	• Apply the concepts and principles of chemical analysis to environmental, industrial, biological and food sciences.		√	√
13.	• Apply chemical knowledge to address ethical and social issues in the work environment.			√

MSc Award				
	Develop technical competence and skills necessary for carrying out original research in academic and industrial research environment.			
14.	• Acquire and organize resource materials.		√	
15.	• Present materials effectively, both orally and in writing.		√	
16.	• Participate confidently in co-operative or independent projects.	√	√	√
	Acquire and integrate advanced knowledge from a variety of disciplines especially chemical principles and research methodologies via discovery-based studies in order to become effective problem solvers and innovators.			
17.	• Recognize the relation between theory and practices in selected areas of study.	√	√	
18.	• Identify and analyze the limitations and challenges in existing research and methodology through critical evaluation of chemical information and key findings of scientific papers.	√	√	
19.	• Have an informed respect for the knowledge and technical skills in chemistry and molecular sciences, with special emphasis on the molecular design, chemical methodology, operations of advanced chemical instrumentations and laboratory procedures in synthetic and analytical chemistry.	√	√	
20.	• Evaluate experimental data through testing hypotheses, defining problems and creating innovative and practical solutions.	√		√
	Create new knowledge, methodology and understanding through the process of research and inquiry.			
21.	• Carry out research and development work.	√	√	√
22.	• Develop expertise in a chosen subject area through conducting research as well as the application of theory and techniques provided by the programme.	√	√	√
23.	• Manage and present research findings in a precise and coherent manner.	√	√	√

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 real-life problems.

A3: Accomplishments
Demonstrate accomplishments of discovery/innovation/creativity through producing/constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

Part II Programme Requirement

1. Core Courses for BSc Award (38 credit units)

Course Code	Course Title	Level	Credit Units	Remarks
MA2172	Applied Statistics for Sciences and Engineering	B2	3	
CHEM2004	Principles of Analytical Chemistry	B2	4	
CHEM2006	Principles of Inorganic Chemistry	B2	4	
CHEM2007	Principles of Organic Chemistry	B2	4	
CHEM2008	Principles of Physical Chemistry	B2	4	
CHEM2073	Entrepreneurship Programme In Chemistry 1	B2	3	
CHEM3014	Inorganic Chemistry	B3	4	
CHEM3015	Organic Chemistry	B3	4	
CHEM3016	Physical Chemistry	B3	4	
CHEM3027	Analytical Chemistry	B3	4	

2. Electives for BSc Award (28 credit units)

Choose electives from <u>both</u> Group A and Group B.

Group A (at least 3 credit units or above)

Course Code	Course Title	Level	Credit Units	Remarks
CHEM3042	Directed Studies in Biology/Chemistry/Environmental Sciences	B3/B4	1-4	Exclusive from Group B, i.e. students can choose this course in either Group A <u>or</u> Group B.
CHEM4036	Project	B4	6	Students of the GREAT stream cannot take this course.
CSCI4002 <u>or</u> CSCI4005	Industrial Attachment Scheme for Science Students Overseas Internship Scheme for Science Students	B3	3	

<u>Note:</u>
Students who have completed exchange studies with credit transfer (at least 3 credit units) are considered as having fulfilled Group A requirement.

Group B

Course Code	Course Title	Level	Credit Units	Remarks
CS2204	Fundamentals of Internet Applications Development	B2	3	
CS2360	Java Programming	B2	3	
CSCI3001	Grand Challenges in the World	B3	3	

MA2008	Mathematical and Statistical Laboratory	B2	3	Not offered to Year 2 students of normative 4-year degree and Year 1 students of Advanced Standing I. Course offered in alternate years from 2015/16.
CHEM2003	Biochemistry	B2	3	BMS2004 Biochemistry is an equivalent course offered to students from 2017/18.
CHEM2005	Principles of Environmental Chemistry	B2	4	
CHEM3012	Genetics	B3	4	
CHEM3038	Environmental Sampling and Risk Assessment	B3	4	
CHEM3042	Directed Studies in Biology/ Chemistry/ Environmental Sciences	B3/B4	1-4	Exclusive from Group A, i.e. students can choose this course in either Group A or Group B.
CHEM3081	Chemical Biology of DNA and RNA	B3	3	
CHEM3084	Forensic Imaging	B3	3	
CHEM3085	Gemological Science	B3	3	
CHEM4021	Environmental Pollution	B4	4	
CHEM4022	Environmental Toxicology	B4	4	
CHEM4037	Seminar Series	B4	3	
CHEM4041	Selected Topics in Chemistry	B4	4	
CHEM4088	Entrepreneurship Programme In Chemistry 2	B4	6	
CHEM3052	Chemistry Beyond the Molecule: Supramolecular Chemistry	B3	3	Course offered in alternate years.
CHEM3053	Computational Chemistry	B3	3	Course offered in alternate years.
CHEM3055	Green Chemistry	B3	3	Course offered in alternate years.
CHEM3082	Graphene: Fundamentals and Emergent Applications	B3	3	Course offered in alternate years.
CHEM3083	Cosmetic Chemistry	B3	3	Course offered in alternate years.
CHEM4029	Advanced Analytical Chemistry	B4	4	Course offered in alternate years.
CHEM4030	Advanced Inorganic Chemistry	B4	4	Course offered in alternate years.
CHEM4031	Advanced Organic Chemistry	B4	4	Course offered in alternate years.
CHEM4033	Industrial Chemistry	B4	4	Course offered in alternate years.
CHEM4034	Environmental Control and Waste Treatment	B4	4	Course offered in alternate years.
CHEM4035	Environmental Measurements	B4	4	Course offered in alternate years.
CHEM4043	Food Chemistry	B4	3	Course offered in alternate years.

CHEM4045	Medicinal Chemistry	B4	3	Course offered in alternate years.
CHEM4051	Forensic Chemistry	B4	3	Course offered in alternate years.
CHEM4054	Chemical Bonding and Molecular Spectroscopy	B4	3	Course offered in alternate years.
CHEM4084	Crystallography/Solid-state Inorganic Chemistry	B4	4	Course offered in alternate years.
CHEM4085	Testing and Certification Sciences	B4	4	Course offered in alternate years.
CHEM4089	Techniques and Instrumentation for Chemical Biology	B4	4	Course offered in alternate years.

3. Core Courses for MSc Award (30 credit units)

Course Code	Course Title	Level	Credit Units	Remarks
CHEM6118	Advanced Chemical Instrumentation	P6	3	Any three of these courses can be taken as electives in the first three years of study.
CHEM6119	Frontiers in Chemical Biology	P6	3	
CHEM6121	Academic and Industrial Research, Development and Innovation	P6	3	
CHEM6125	Selected Topics in Chemistry & Molecular Sciences	P6	3	
CHEM6126	Advanced Seminar Series	P6	3	
CHEM6123	Postgraduate Symposium	P6	1	
CHEM6127	Dissertation	P6	14	

Part III Admission Requirements for Entry to the Programme, if any

(Admission requirements here refers to specific requirements for students already admitted to the College/School/Department with an undeclared major. Academic units can state the prerequisites required for admission to the major.)

Nil

Part IV Accreditation by Professional / Statutory Bodies

Nil

Part V Additional Information

Eligibility Criteria

Both high caliber secondary school graduates and CityU Year One students meeting the following admission criteria are eligible:

For Secondary School Students:
Local: HKDSE score ≥ 28
Non-local: IB score ≥ 38
Mainland: follow the entrant scholarship requirements

For Existing Year One Students:
Credit units taken at the end of the first year study ⩾ 36
Ranked top 10% of Year One students in the College of Science
CGPA ≥ 3.40

Study Arrangement

Upon entry, eligible entrants are given an offer into the UGC-funded undergraduate programme (i.e. Bachelor of Science in Chemistry, BSCHEM), plus a conditional offer into the self-financing taught postgraduate programme (i.e. Master of Science in Chemistry, MSCHEM).

Qualified students will register as undergraduate students in the first three years of study (Year 1 to Year 3), and continue to pursue the taught postgraduate degree programme as taught postgraduate students in the fourth year of study (Year 4).

Students should acquire the minimum CGPA 3.40 to maintain the status of taking the '3+1' Programme, which will be reviewed by the end of Year 1, 2 and 3. For students joining the Programme after Year 1, their CGPA will reviewed by the end of Year 2 and 3 only.

If admitted students fail to achieve the required CGPA ⩾ 3.40 during the first three years of study, they should not be allowed to continue with the '3+1' Programme. However, they can continue and complete the regular BSCHEM programme.

Students failing to achieve a CGPA of 3.40 will normally not be allowed to re-enter the '3+1' Programme, unless there are very strong justifications and approval from the Dean.

Curriculum Structure and Tuition Fee

<table>
<tr><td>Year 1</td><td>Year 2</td><td>Year 3</td><td>Year 4</td></tr>
<tr><td colspan="3">UG Curriculum (≥120 CUs), out of which 9 CUs are TPG courses as electives for students in the CityU Talents Programme.</td><td>TPG Curriculum (30 CUs), with 9 CUs nominally transferred from UG.</td></tr>
<tr><td colspan="3">Registered as UG students, paying UG tuition fees.</td><td>Registered as TPG students, paying self-financing TPG tuition fees for 21 CUs.</td></tr>
</table>

Part VI Curriculum Map

(The curriculum map shows the mapping between courses and the PILOs. It should cover all courses designed specifically for the major.)

Course			PILOs												DEC		
Code	**Title**	**Credit**	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**	**P10**	**P11**	**P12**	**P13**	**A1**	**A2**	**A3**
Core Courses for BSc Award																		
MA2172	Applied Statistics for Sciences and Engineering	3							✓								✓	
CHEM2004	Principles of Analytical Chemistry	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	
CHEM2006	Principles of Inorganic Chemistry	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	
CHEM2007	Principles of Organic Chemistry	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓	✓	
CHEM2008	Principles of Physical Chemistry	4	✓	✓	✓	✓	✓		✓	✓						✓	✓	
CHEM2073	Entrepreneurship Programme In Chemistry 1	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓	✓	
CHEM3014	Inorganic Chemistry	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					✓	✓
CHEM3015	Organic Chemistry	4	✓	✓	✓	✓	✓	✓	✓	✓							✓	✓
CHEM3016	Physical Chemistry	4	✓	✓	✓	✓		✓		✓							✓	✓
CHEM3027	Analytical Chemistry	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓	✓
Electives for BSc Award																		
CS2204	Fundamentals of Internet Applications Development	3							✓								✓	
CS2360	Java Programming	3							✓								✓	
CSCI3001	Grand Challenges in the World	3					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MA2008	Mathematical and Statistical Laboratory	3							✓								✓	
CHEM2003	Biochemistry	3	✓	✓	✓	✓	✓		✓							✓	✓	
CHEM2005	Principles of Environmental Chemistry	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
CHEM3012	Genetics	4	✓			✓	✓	✓	✓	✓	✓	✓		✓	✓		✓	✓
CHEM3038	Environmental Sampling and Risk Assessment	4		✓	✓	✓	✓	✓	✓	✓		✓		✓	✓		✓	✓
CHEM3042	Directed Studies in Biology/ Chemistry/ Environmental Sciences	1-4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
CHEM3081	Chemical Biology of DNA and RNA	3	✓	✓	✓	✓	✓		✓	✓	✓	✓		✓	✓		✓	✓
CHEM3084	Forensic Imaging	3					✓	✓	✓	✓	✓	✓		✓	✓		✓	✓
CHEM3085	Gemological Science	3				✓	✓	✓	✓	✓	✓	✓		✓	✓		✓	✓
CHEM4021	Environmental Pollution	4					✓	✓	✓	✓				✓	✓		✓	✓
CHEM4022	Environmental Toxicology	4					✓		✓	✓				✓	✓		✓	✓
CHEM4036	Project	6					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

.

CHEM4037	Seminar Series	3								✓	✓	✓				✓	✓	✓
CHEM4041	Selected Topics in Chemistry	4	✓	✓		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	
CHEM4088	Entrepreneurship Programme In Chemistry 2	6					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CHEM3052#	Chemistry Beyond the Molecule: Supramolecular Chemistry	3	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	
CHEM3053#	Computational Chemistry	3	✓	✓	✓											✓	✓	
CHEM3055#	Green Chemistry	3	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	
CHEM3082#	Graphene: Fundamentals and Emergent Applications	3	✓	✓	✓	✓					✓	✓	✓				✓	✓
CHEM3083#	Cosmetic Chemistry	3				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓
CHEM4029#	Advanced Analytical Chemistry	4	✓	✓	✓	✓			✓	✓	✓	✓		✓	✓		✓	✓
CHEM4030#	Advanced Inorganic Chemistry	4	✓	✓	✓	✓					✓	✓	✓		✓		✓	✓
CHEM4031#	Advanced Organic Chemistry	4	✓	✓	✓	✓							✓		✓		✓	✓
CHEM4033#	Industrial Chemistry	4	✓		✓		✓		✓	✓	✓	✓		✓	✓		✓	✓
CHEM4034#	Environmental Control and Waste Treatment	4							✓	✓	✓	✓		✓	✓		✓	✓
CHEM4035#	Environmental Measurements	4				✓		✓	✓	✓	✓			✓	✓		✓	✓
CHEM4043#	Food Chemistry	3	✓	✓	✓	✓		✓	✓		✓	✓	✓	✓	✓		✓	✓
CHEM4045#	Medicinal Chemistry	3		✓	✓						✓		✓		✓		✓	✓
CHEM4051#	Forensic Chemistry	3				✓					✓			✓	✓		✓	✓
CHEM4054#	Chemical Bonding and Molecular Spectroscopy	3	✓	✓	✓	✓							✓	✓		✓	✓	
CHEM4084#	Crystallography/Solid-state Inorganic Chemistry	4	✓	✓	✓	✓							✓	✓			✓	✓
CHEM4085#	Testing and Certification Sciences	4	✓	✓	✓	✓			✓		✓	✓		✓	✓		✓	✓
CHEM4089#	Techniques and Instrumentation for Chemical Biology	4					✓	✓	✓	✓	✓	✓		✓	✓		✓	✓
CSCI4002 or CSCI4005	Industrial Attachment Scheme for Science Students Overseas Internship Scheme for Science Students	3					✓	✓	✓	✓	✓	✓	✓	✓	✓			✓

#Courses offered in alternate years.

Course			PILOs										DEC		
Code	**Title**	**Credit**	**P14**	**P15**	**P16**	**P17**	**P18**	**P19**	**P20**	**P21**	**P22**	**P23**	**A1**	**A2**	**A3**
Core Courses for MSc Award															
CHEM6118	Advanced Chemical Instrumentation	3	✓			✓	✓	✓						✓	
CHEM6119	Frontiers in Chemical Biology	3	✓			✓	✓	✓					✓	✓	
CHEM6121	Academic and Industrial Research, Development and Innovation	3	✓	✓	✓	✓	✓	✓			✓			✓	✓
CHEM6123	Postgraduate Symposium	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CHEM6125	Selected Topics in Chemistry & Molecular Sciences	3	✓	✓		✓	✓	✓				✓	✓	✓	✓
CHEM6126	Advanced Seminar Series	3	✓	✓		✓	✓	✓	✓				✓	✓	✓
CHEM6127	Dissertation	14	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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 real-life problems.

A3: *Accomplishments*
Demonstrate accomplishments of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.