

## Enquiry for Major/Minor/Programme Requirements

Major Title	Major in Chemistry
Offered to students admitted to Year 1 in	2020-2021

### Objectives:

The Major in Chemistry aims to provide students with a solid training in major areas of chemistry. The curriculum includes core courses covering topics in physical, inorganic, organic, and analytical chemistry. A wide selection of elective courses in chemical biology, chemical analysis, computational chemistry, environmental chemistry, industrial chemistry, interfacial science, material, and medicinal chemistry, is also available to provide students with knowledge and training to help them meet the dynamic and ever-changing challenges in science and technology. Graduates of the Chemistry Major programme will be proficient in the principles and experimental skills of chemistry. The programme will also equip students with transferable skills in both theoretical and experimental investigations in sciences that are crucial for their future careers in a knowledge-based economy. It is expected that our graduates will be able to meet local and regional requirements in the industrial, commercial, government or education sectors and will become future leaders of these sectors.

### Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1 : demonstrate an understanding across a wide range of topics in chemistry, from basic areas such as analytical, inorganic, organic & physical chemistry, to advanced topics related to current research in chemistry (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 2 : demonstrate an in-depth understanding of fundamental physicochemical principles with the ability to apply that knowledge to the solution of theoretical & practical problems (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 3 : have developed an awareness & understanding of scientific and ethical issues where chemistry relates to other disciplines, and an appreciation of the impact of chemistry in the modern world (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 4 : have substantially developed advanced experimental skills including chemical synthesis, analysis & operation of modern instrumentation, and data analysis skills with the ability to interpret experimental information & infer appropriate conclusions (by requiring of no less than 100 hours of laboratory classes in the curriculum)
- PLO 5 : demonstrate problem-solving skills, critical thinking, creativity & effective written & oral communication skills, and to co-operate with other people & participate as an effective team member (by means of coursework, laboratory-based learning, group project & presentation opportunities in the curriculum)
- PLO 6 : gain experience in working in the real-life industrial or research environment, and enhance their initiative, interpersonal skills, time management skills & project organization skills (by arrangement for student internship opportunities, directed studies of no less than three weeks with chemistry-related companies or research laboratories, or any other relevant capstone experience in chemistry)

### Impermissible Combination:

Major in Chemistry (Intensive)

Minor in Chemistry

### Required courses (96 credits)

#### 1. Introductory level courses (48 credits)

##### Disciplinary Core Courses: Science Foundation Courses (12 credits)

- SCNC1111 Scientific method and reasoning (6)  
SCNC1112 Fundamentals of modern science (6)

##### Disciplinary Core Courses (36 credits)

- CHEM1042 General chemistry I (6)  
CHEM1043 General chemistry II (6)  
CHEM2241 Analytical chemistry I (6)  
CHEM2341 Inorganic chemistry I (6)  
CHEM2441 Organic chemistry I (6)  
CHEM2541 Introductory physical chemistry (6)

#### 2. Advanced level courses (42 credits)

##### Disciplinary Core Course (30 credits)

- CHEM3241 Analytical chemistry II: chemical instrumentation (6)  
CHEM3341 Inorganic chemistry II (6)  
CHEM3441 Organic chemistry II (6)  
CHEM3443 Organic chemistry laboratory (6)  
CHEM3541 Physical chemistry: Introduction to quantum chemistry (6)

##### Disciplinary Electives (12 credits)

At least 12 credits of any level 4 Chemistry (CHEM4XXX) courses. The current list include courses in List A.

##### List A

- CHEM4142 Symmetry, group theory and applications (6)  
CHEM4143 Interfacial science and technology (6)

CHEM4144	Advanced materials (6)
CHEM4145	Medicinal chemistry (6)
CHEM4147	Supramolecular chemistry (6)
CHEM4148	Frontiers in Modern Chemical Science (6)
CHEM4241	Modern chemical instrumentation and applications (6)
CHEM4242	Analytical chemistry (6)
CHEM4341	Advanced inorganic chemistry (6)
CHEM4342	Organometallic chemistry (6)
CHEM4441	Advanced organic chemistry (6)
CHEM4443	Integrated organic synthesis (6)
CHEM4444	Chemical biology (6)
CHEM4542	Computational chemistry (6)
CHEM4543	Advanced physical chemistry (6)
CHEM4544	Electrochemical science and technology (6)

### 3. Capstone requirement (6 credits)

*At least 6 credits selected from the following courses:*

CHEM3999	Directed studies in chemistry (6)
CHEM4910	Chemistry literacy and research (6)
CHEM4911	Capstone experience for chemistry undergraduates: HKUtopia (6)
CHEM4966	Chemistry internship (6)
CHEM4999	Chemistry project (12)

#### Notes:

1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.

2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.

4. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fulfill this requirement are advised to take CHEM1041 Foundations of chemistry.

5. Candidates who have been admitted to Year 1 in 2020-21 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1111. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.

- Level 4 or above in Mathematics Extended Part Module 1 or 2 in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Mathematics Higher Level in International Baccalaureate (IB)
- Grade B or above in Mathematics and Further Mathematics in General Certificate of Education Advanced Level (GCEAL)
- Mathematics qualification in Gao Kao will be considered on a case-by-case basis

#### Remarks:

Important! Ultimate responsibility rests with students to ensure that the required pre-requisites and co-requisite of selected courses are fulfilled. Students must take and pass all required courses in the selected primary science major in order to satisfy the degree graduation requirements.