Master of Philosophy (MPhil) and Doctor of Philosophy (PhD) Programs in Chemistry

Curriculum for Master of Philosophy (MPhil) Program in Chemistry

The Master of Philosophy (MPhil) program is designed with flexibility in order that students may tailor course selections according to their needs and interests. Requirements consist of approved coursework and an original research thesis at master's level. Students with a first degree in an area other than that of their postgraduate program may be required to take additional courses.

To fulfill the degree requirements, students are expected to attend and present seminars, undertake coursework and conduct thesis research. In the final stage of study, students are required to submit a thesis to the Department and, subsequently, to present and defend it.

Specific program requirements are:

- Completion of a total of 12 credits of approved coursework;
- Completion of and passing CHEM 6770 Professional Development in Science (Chemistry). Students are expected to complete the course in their first year of study. The maximum time allowed for course completion is two years for full-time students, or three years for part-time students. The 2 credits earned from CHEM 6770 cannot be counted toward the credit requirements;
- Completion of LANG 5010 Postgraduate English for Science Studies, which should be taken in the first year of study. The 1 credit earned from LANG 5010 cannot be counted toward the credit requirements;
- Registration of CHEM 6000 Chemistry Seminar in all but one regular term of full-time enrollment;
- Registration in CHEM 6990 MPhil Thesis Research; and
- Presentation and oral defense of the MPhil thesis.

<u>Nano Science and Technology Concentration</u>

In addition to the existing program requirements, students who opt for the Nano Science and Technology concentration are required to:

- Take at least one NANO course as a part of the 12 credits of required coursework;
- Complete NANO 6010 Advanced Topics in Nano Science and Technology once; and
- Conduct research in nano area.

Molecular Medicine Concentration

In addition to the existing program requirements, students who opt for the Molecular Medicine concentration are required to:

- Take LIFS 6660 Molecular Medicine and at least one of the following courses as a part of the 12 credits of required coursework:

CHEM	5160	Advanced Medicinal Chemistry
LIFS	4380	Pharmacology and Toxicology
LIFS	4760	Biochemistry of Diseases
LIFS	5260	Biochemical and Molecular Basis of Diseases

- Conduct research in the area of molecular medicine.

Scientific Computation Concentration

In addition to the existing program requirements, students who opt for the Scientific Computation concentration are required to:

- Complete MATH 6915 Scientific Computation Seminar. The 1 credit earned cannot be counted toward the credit requirements;
- Complete one computation related course from the list below as a part of the 12 credits of required coursework:

CHEM	5210	Computational Chemistry
MATH	5311	Advanced Numerical Methods I
MATH	5312	Advanced Numerical Methods II
MATH	5350	Computational Fluid Dynamics for Inviscid Flows
MATH	5360	Weather, Climate and Pollution
PHYS	5410	Numerical Modeling in Physics

- Conduct research in the area of scientific computation; and
- Give a one-hour seminar on the related research within their first four regular terms of study.

Curriculum for Doctor of Philosophy (PhD) Program in Chemistry

The Doctor of Philosophy (PhD) program aims to prepare students through the execution and completion of a substantial research project to become mature, independent scientists who themselves are then capable of the design, initiation and execution of their own original projects in academic or industrial environments. The admission to the program is to be regarded as a privilege, and the subsequent execution of the research project by a PhD candidate is a major undertaking. It requires the application of considerable depth and breadth of scholarship, and there must be substantial discovery of new science. The final PhD thesis must reflect clearly and completely the fulfillment of these criteria.

To fulfill the degree requirements, students are expected to conduct the thesis research under the supervision of a designated supervisor. In addition, students must attend and present seminars, and undertake coursework. Entry into the program is by way of a comprehensive qualifying examination set by the Department. In the final stage of study, students are required to submit the PhD thesis to the Department, and subsequently to present and defend it.

Specific program requirements are:

- Completion of a total of 12 credits of approved coursework. *(No further coursework is required for HKUST MPhil (CHEM) graduates. Credit transfer may be granted on a case-by-case basis to students who obtained master's degree from other universities)*;
- Completion of and passing CHEM 6770 Professional Development in Science (Chemistry). Students are expected to complete the course in their first year of study. The maximum time allowed for course completion is two years for full-time students, or three years for part-time students. The 2 credits earned from CHEM 6770 cannot be counted toward the credit requirements. HKUST MPhil (CHEM) graduates who have taken and passed this course before may be exempted from this requirement, subject to prior approval from the Department Head and PG Coordinator;
- Completion of LANG 5010 Postgraduate English for Science Studies, which should be taken in the first year of study. The 1 credit earned from LANG 5010 cannot be counted toward the credit requirements. HKUST MPhil graduates may be considered for exemption from this requirement;
- Registration in CHEM 6000 Chemistry Seminar in all but one regular term of full-time enrollment;
- Passing a qualifying examination;
- Seminar presentation based on literature unrelated to the student's doctoral research;
- Defense of an original research proposal before a departmental committee;
- Registration in CHEM 7990 PhD Thesis Research; and
- Presentation and oral defense of the PhD thesis.

<u>Nano Science and Technology Concentration</u>

In addition to the existing program requirements, students who opt for the Nano Science and Technology concentration are required to:

- Take at least one NANO course to fulfill the 12 credits of required coursework (students obtained an HKUST MPhil degree in Chemistry but have not taken any NANO courses are required to take at least one);

- Complete NANO 6010 Advanced Topics in Nano Science and Technology once; and
- Conduct research in nano area.

Molecular Medicine Concentration

In addition to the existing program requirements, students who opt for the Molecular Medicine concentration are required to:

- Take LIFS 6660 Molecular Medicine and at least one of the following courses as a part of the 12 credits of required coursework:

CHEM	5160	Advanced Medicinal Chemistry
LIFS	4380	Pharmacology and Toxicology
LIFS	4760	Biochemistry of Diseases
LIFS	5260	Biochemical and Molecular Basis of Diseases

  (Students obtained an HKUST MPhil degree in Chemistry, Biochemistry, or Biology, but have not taken any of the above courses, are required to take LIFS 6660 and at least one of the above courses.)
- Conduct research in the area of molecular medicine.

Scientific Computation Concentration

In addition to the existing program requirements, students who opt for the Scientific Computation concentration are required to:

- Complete MATH 6915 Scientific Computation Seminar. The 1 credit earned cannot be counted toward the credit requirements;
- Complete one computation related course from the list below as a part of the 12 credits of required coursework:

CHEM	5210	Computational Chemistry
MATH	5311	Advanced Numerical Methods I
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PHYS	5410	Numerical Modeling in Physics

- Conduct research in the area of scientific computation; and
- Give a one-hour seminar on the related research within their first four regular terms of study.