Master of Philosophy (MPhil) and Doctor of Philosophy (PhD) Programs in Computer Science and Engineering

Curriculum for Master of Philosophy (MPhil) Program in Computer Science and Engineering

The Master of Philosophy (MPhil) program seeks to strengthen students' knowledge in computer science and expose them to issues involved in the development, scientific educational and commercial applications of computer systems. Students must fulfill the following program requirements:

a) Completion of at least five postgraduate courses (15 credits), of which at least 8 credits must be earned at HKUST. Credits used to satisfy the course requirements must cover at least four established research areas of the Department;

b) Taking and passing ENGG 6770 Professional Development in Engineering in their first 1.5 years of study. Students may be exempted from certain course events, subject to prior approval of the School. Part-time students may be given extension to complete the course, subject to prior approval of the School. The 1 credit earned from ENGG 6770 cannot be counted toward the credit requirements;

c) Full-time RPg students are required to take an English Language Proficiency Assessment (ELPA) Speaking Test administered by the Center for Language Education before the start of their first term of study. Students whose ELPA Speaking Test score is below Level 4, or who failed to take the test in their first term of study, are required to take LANG 5000 Foundation in Listening & Speaking for Postgraduate Students until they pass the course by attaining at least Level 4 in the ELPA Speaking Test before graduation. The 1 credit earned from LANG 5000 cannot be counted toward the credit requirements;

d) Completion of LANG 5001 Postgraduate English for Engineering Research Studies. Students can be exempted from taking LANG 5001 with the agreement of the Department Head and PG Coordinator. The 1 credit earned from LANG 5001 cannot be counted toward the credit requirements;

e) Completion of Computer Science and Engineering Seminar for two terms;

f) Registration in COMP 6990 MPhil Thesis Research; and

g) Presentation and oral defense of the MPhil thesis.

Energy Technology Concentration

In addition to the program requirements specified above, students who opt for the Energy Technology concentration are required to:

- Take one ENEG course;

- Complete ENEG 6010 Advanced Topics in Energy Technology for one term; and
- Conduct research in energy area.

Scientific Computation Concentration

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

(i)   MPhil: Complete a minimum of 7 credits from the following course lists.
      PhD: Complete a minimum of 10 credits from the follow course lists.

The credits earned under the concentration will be counted toward the total credit requirements of the programs.

Core Courses
MPhil: at least 3 credits
PhD: at least 6 credits

All students must take MATH 6915 and MATH 6916. Credits earned from MATH 6915 can be repeated for up to 2 credits.

COMP	5112	Parallel Programming
CIVL	5390	Finite Element Methods; or
MECH	5930	Finite Element Methods
CSIC	5001	Introduction to Advanced Computing Systems
CSIC	5011	Topological and Geometric Data Reduction and Visualization
CSIC	5031	Modeling, Optimization and Statistics
MATH	5311	Advanced Numerical Methods I
MATH	6915	Scientific Computation Seminar
MATH	6916	Student Seminars on Computation Related Research

Elective Courses

CHEM	5210	Computational Chemistry
CHEM	5220	Statistical Mechanics: Theory and Applications in Complex Systems
COMP	5212	Machine Learning
COMP	5213	Introduction to Bayesian Networks
COMP	5331	Knowledge Discovery in Databases
COMP	5421	Computer Vision
CSIC	5190	Special Topics in Scientific Computation
ELEC	5810	Introduction to Bioinformatics Algorithms
ELEC	5140	Advanced Computer Architecture
MATH	5350	Computational Fluid Dynamics for Inviscid Flows
MATH	5360	Weather, Climate and Pollution
MATH	5411	Advanced Probability Theory I
MATH	5431	Advanced Mathematical Statistics I

MECH	5230	Computational Fluid Dynamics and Heat Transfer
MECH	5280	Transport Phenomena and Its Application in Energy Systems
MSDM	5004	Mathematical Methods for Data Analysis
PHYS	5410	Numerical Modeling in Physics

(ii) Conduct research in the area of scientific computation.

Curriculum for Doctor of Philosophy (PhD) Program in Computer Science and Engineering

The Doctor of Philosophy (PhD) program aims to develop the skills needed to identify research issues related to practical applications, to formulate an original research plan that addresses some of the research identified and to independently create a computing-related solution.

Specific requirements for the PhD program are as below:

a) Completion of at least seven postgraduate (PG) courses (21 credits). Of the seven PG courses, four are required to be PG core courses in different selected core research areas. A list of PG core courses and the areas with which they are affiliated is maintained by the Department. At least one of the PG core courses should be in the area of "Theoretical Computer Science". Students must complete all four PG core courses in different areas by the end of the second year of their PhD study, and of the four core courses, at least two must be completed in their first year of study. Students must obtain a B+ or above for all four PG core courses. Only one Independent Studies course may be used to satisfy the course requirements. Students are also required to fulfill the school requirements on PhD programs stipulated in the section of *School of Engineering*.

(Note: No undergraduate (UG) course can be used to satisfy any of these PG course requirements.)

b) Credits transferred from programs completed in other universities will be considered on a case-by-case basis, subject to the approval of the departmental PG Committee. No UG courses can be used for credit transfer to the PhD program. Credits from no more than two PG courses can be transferred from outside the Department.

c) Students must obtain a grade B or above in each of the following UG courses or equivalent, subject to the approval of the PG Coordinator. Credits earned from the following UG courses cannot be counted toward the degree requirements:

- COMP 3511 Operating Systems
- COMP 3711 Design and Analysis of Algorithms
- COMP 3721 Theory of Computation

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d) Taking and passing ENGG 6770 Professional Development in Engineering and COMP 6770 Professional Development in Computer Science and Engineering for all full-time and part-time students.   Students may be exempted from certain ENGG 6770 events, subject to prior approval of the School.   Part-time students may be exempted from a maximum of 50% of mini-workshops of COMP 6770, subject to prior approval of the Department.   Students are expected to complete the Professional Development courses in their first two years of study.   Subject to approval, part-time students may be given extension to complete the courses.   HKUST MPhil   graduates in Computer Science and Engineering who have taken and passed ENGG 6770 before may be exempted from taking the same course, subject to prior approval from the Department Head and PG Coordinator.

e) Full-time RPg students are required to take an English Language Proficiency Assessment (ELPA) Speaking Test administered by the Center for Language Education before the start of their first term of study.   Students whose ELPA Speaking Test score is below Level 4, or who failed to take the test in their first term of study, are required to take LANG 5000 Foundation in Listening & Speaking for Postgraduate Students until they pass the course by attaining at least Level 4 in the ELPA Speaking Test before graduation;

f) Passing LANG 5001 Postgraduate English for Engineering Research Studies. Students can be exempted from taking LANG 5001 with the agreement of the Department Head and PG Coordinator.

g) The credits earned from ENGG 6770, COMP 6770, LANG 5000 and LANG 5001 cannot be counted toward the credit requirements.

h) Completion of COMP 6911/6912 Computer Science and Engineering Seminar I/II for two terms.

i) Passing a qualifying examination within the first 18 months after admission, with a maximum of two attempts.   The qualifying examination consists of a comprehensive, written critical survey and review of the student's intended research focus, and a public oral examination.

j) Submission of a thesis proposal and defending it at a public oral examination, normally within one year after satisfying the qualifying examination requirement, with a maximum of two attempts.   The second attempt must be completed within six months of the first attempt.   The thesis proposal requirement must be completed before attempting the final thesis defense.

k) Registration in COMP 7990 Doctoral Thesis Research.

l) Presentation and oral defense of the PhD thesis.

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　　 The credits earned under the concentration will be counted toward the total credit requirements of the programs.

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