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

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

The Master of Philosophy (MPhil) program is designed for students who are interested in pursuing a career in research and development in industry or academia. It is also an excellent preparation for those interested in pursuing a PhD degree.

Besides completing an approved postgraduate course sequence, an MPhil student must complete, under the supervision of a research advisor, a research project leading to a master's thesis and pass an oral thesis defense. To be eligible for an MPhil degree, a student must:

- Complete at least 15 credits of approved coursework, of which at least 9 in the area of Electronic and Computer Engineering;
- Take and pass 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;
- 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;
- Pass LANG 5001 Postgraduate English for Engineering Research Studies, except those who register in part-time mode. Students can be exempted from taking LANG 5001 with the approval of the Department Head and PG Coordinator;
- The credits earned from ENGG 6770, LANG 5000, LANG 5001 and ELEC 6900 Independent Study cannot be counted toward the credit requirements;
- Register in ELEC 6990 MPhil Thesis Research; and
- Present and oral defend the MPhil thesis.

<u>Nanotechnology Concentration</u>

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

- Take one NANO course;
- Complete NANO 6010 Advanced Topics in Nano Science and Technology for one term; and

- Conduct research in nano area.

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 Electronic and Computer Engineering

The Doctor of Philosophy (PhD) program caters for students who wish to pursue a career in advanced industrial research and development, or university research and teaching. It emphasizes training in original thinking and independent research. To be eligible for the PhD degree, a student must:

- Complete at least 15 credits of approved postgraduate coursework, of which at least 9 in the area of Electronic and Computer Engineering;
- Fulfill the school requirements on PhD programs stipulated in the section of *School of Engineering*;
- Take and pass ENGG 6770 Professional Development in Engineering and ELEC 6770 Professional Development in Electronic and Computer Engineering. 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 ELEC 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 Electronic and Computer 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;
- 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;

- Pass LANG 5001 Postgraduate English for Engineering Research Studies, except those who register in part-time mode. Students can be exempted from taking LANG 5001 with the agreement of the Department Head and PG Coordinator;
- The credits earned from ENGG 6770, ELEC 6770, LANG 5000, LANG 5001 and ELEC 6900 Independent Study cannot be counted toward the credit requirements;
- Enroll for ELEC 6950 Departmental Seminar, except those who register in part-time mode;
- Pass the qualifying examination within two years after admission, with a maximum of two attempts;
- Pass the thesis proposal before the final thesis defense;
- Register in ELEC 7990 Doctoral Thesis Research; and
- Present and oral defend the PhD thesis.

Nanotechnology Concentration

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

- Take one NANO course;
- Complete NANO 6010 Advanced Topics in Nano Science and Technology for one term; and
- Conduct research in nano area.

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.
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